July
1956

MACHINE AND TOOL

blue book

IN THIS ISSUE:

- How Johnson Motors Build Their Own Special Machines
- American Motors Salvages Crankshafts by Metallizing
- How to Get More and Better Holes With Your Twist Drills

DeSoto's Wi[illegible]son,
more [illegible]tomation
in '57."

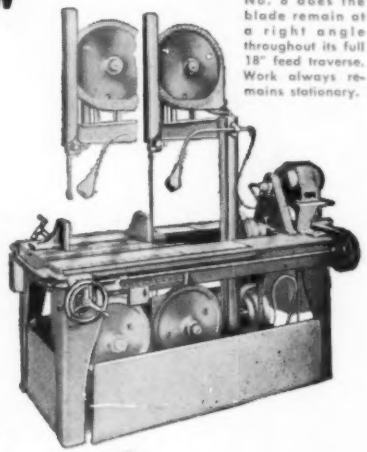
a hitchcock publication

CONTENTS ON PAGES 5 AND 6

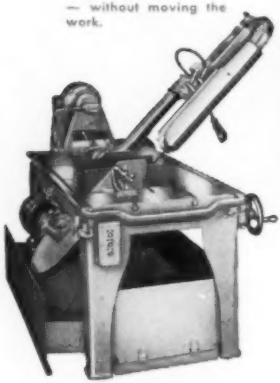
Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal

Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a ½" rod or cut-off an 18" x 18" cross-section.

Rough to Size and Shape

Miter

Index

cut off and shape Structural Beams

Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

"Rough Machine" to size and shape with minimun chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

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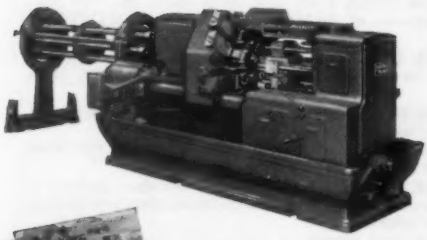

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READER'S GUIDE

MACHINE AND TOOL
blue book

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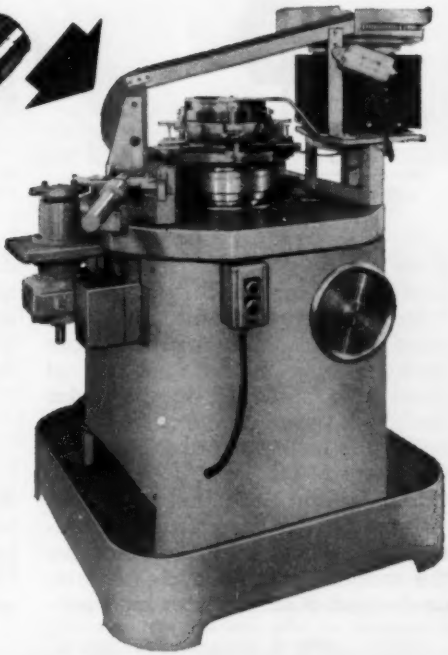

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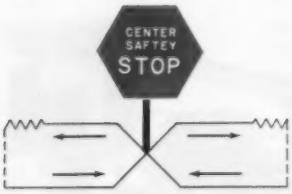


AUTOMATIC RECIPROCATING FEED CYCLE

◀ Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature.

A high production two-fixture setup on a CINCINNATI No. 2MI Plain Automatic Cycle Milling Machine. ▶

Here's a way to turn in a better cost performance record when you have high production milling jobs sandwiched in between toolroom quantity lots. Just assign all of them to a machine equipped for both high production and toolroom milling. ¶In the 3 and 5 hp class, CINCINNATI® ML and MI Automatic Cycle Milling Machines will give you the best cost performance record you've ever seen. You can use the automatic table cycles or not, as desired. And for extra high production setups, like the one illustrated here with a fixture at each end of the table, you'll appreciate a CINCINNATI more than ever because of these two advantages:

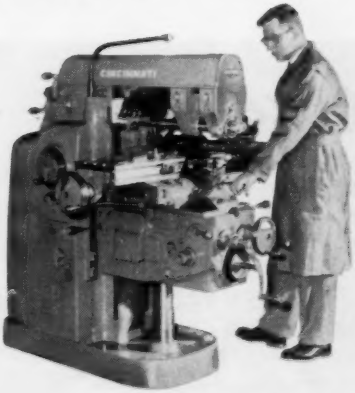
1) Automatic backlash eliminator
2) Center safety stop

Both are standard features of the ML and MI Automatic Cycle Milling Machines. And for a little extra you can also have *automatic spindle stop*. Then the complete

CINCINNATI

cycle stops while the operator reloads the fixtures; savings in time and money and improvement in operating safety are evident for years. ¶Automatic table cycles in no way affect the versatility of the ML's and MI's for small quantity production. You can see why if you will write for catalog No. M-1916. Brief data contained in Sweet's machine tool file.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI No. 2MI Plain Milling Machine. Complete specifications may be obtained by writing for catalog No. M-1916.

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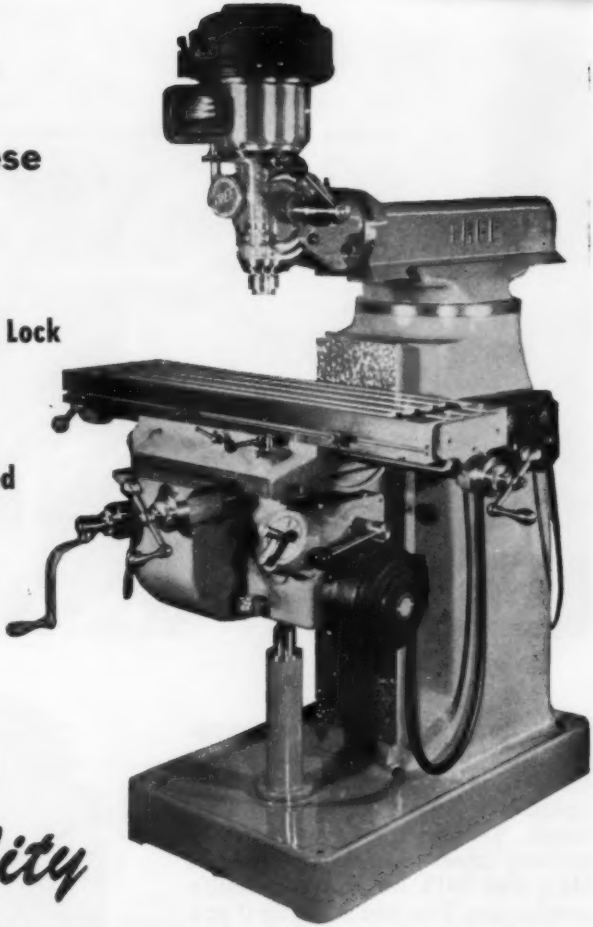
The TREE 2UV MILL

gives you these features–

- Roller Drive
- One Clamp Turret Lock
- Automatic Collet Closer
- Built-in Power Feed
- Rapid Traverse
- Labor Saving Operator Controls



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- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
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- Hardened and ground lead screws by Ex-Cell-O
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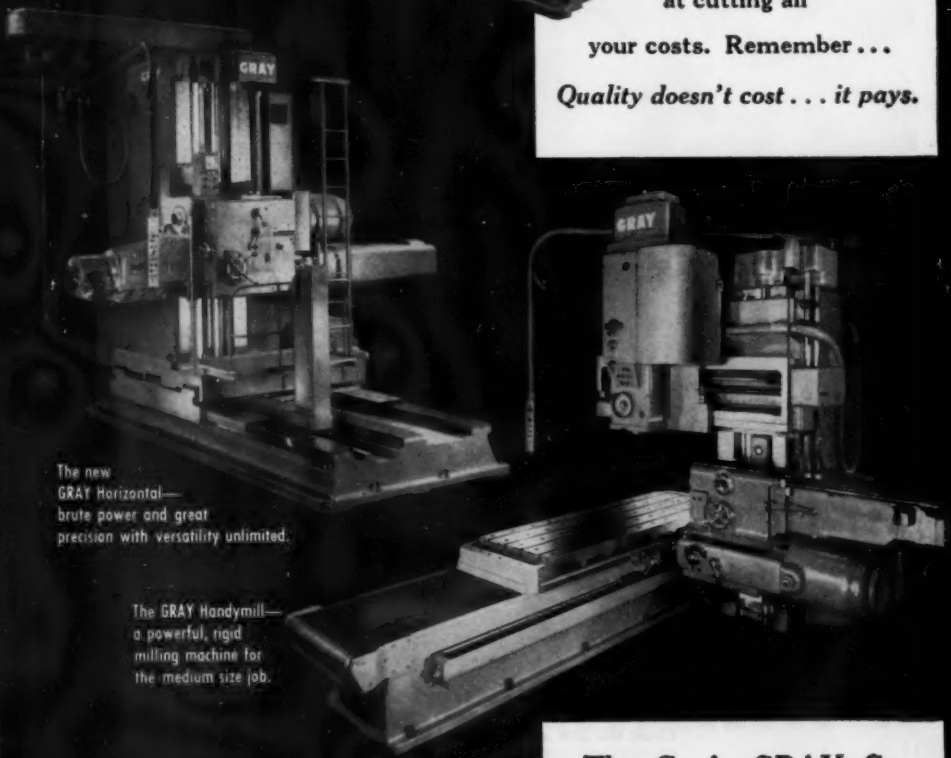

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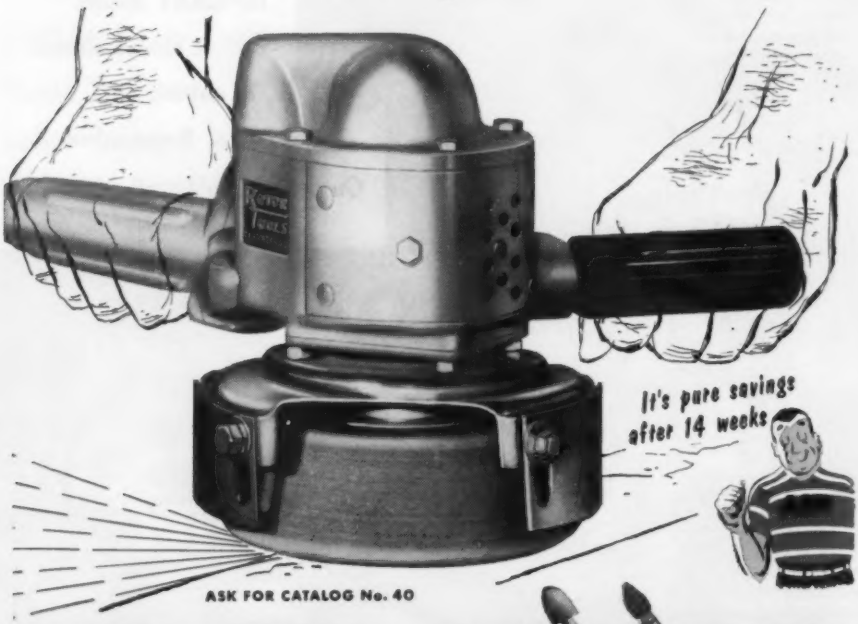

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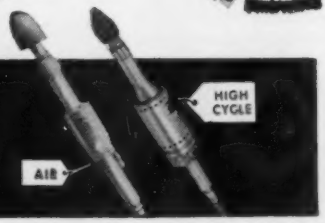

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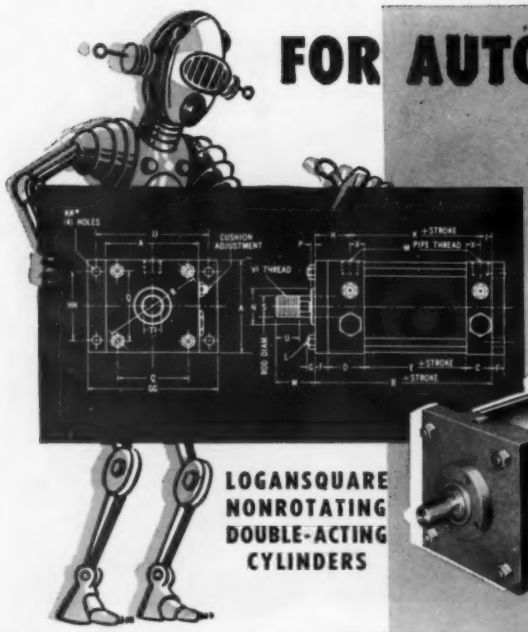

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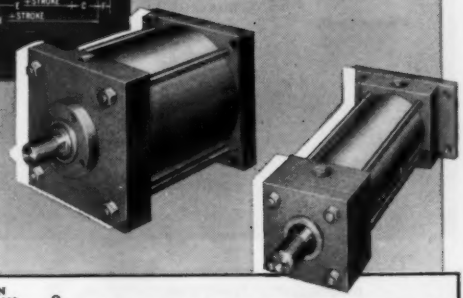

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1½	2	4	1	1½	1½	⅝	½	1⅝	⅛	2½	⅝-18	⅝	1⅝	⅛	1.458	2⅛	⅝	½	⅝	⅝-18	1⅜	⅝	3⅝	1⅞	2⅝	⅝	—	—
2	2½	4	1	1½	1½	⅝	½	1⅝	⅛	2½	⅝-24	⅝	1⅝	⅛	1.856	2⅝	⅝	½	⅝	⅝-18	1⅜	⅝	4½	1⅞	3⅛	⅝	—	—
2½	3	4½	1	1½	1⅝	⅝	½	1⅝	⅛	2½	⅝-24	⅝	1⅝	⅛	2.209	3⅛	⅝	½	⅝	⅝-18	1⅜	⅝	4⅝	2⅛	3⅝	⅝	—	—
3	3½	5	1⅜	1¾	1⅝	⅝	½	1¹¹⁄₁₆	⅛	2½	⅝-24	½	1⅝	⅛	2.651	3¾	⅝	1	⅝	1-14	1⅝	¹¹⁄₁₆	5½	2⅝	4¹¹⁄₁₆	⅝	—	—
4	4½	5½	1⅜	1¾	1⅝	⅝	⅝	1¹¹⁄₁₆	⅛	3	⅝-24	½	1⅝	⅛	3.402	4¹¹⁄₁₆	1		⅝	1-14	1⅝	¹¹⁄₁₆	6½	3¹¹⁄₁₆	5¹¹⁄₁₆	⅝	—	—
5	5½	5½	1⅜	1¾	1⅝	⅝	⅝	1¹¹⁄₁₆	⅛	3½	1-20	½	2	⅛	4.154	5⅞	1⅛	⅝	1⅛	1-14	1⅝	¹¹⁄₁₆	7½	4½	6½	⅝	—	—
6	6½	6½	1½	2	2	⅝	½	1¹¹⁄₁₆	¹¹⁄₁₆	3½	1½-20	⅝	2	⅛	4.903	7¼	1⅝	1⅛	1⅝	1½-12	2½	¹¹⁄₁₆	8½	4⅞	7⅝	⅝	—	—
8	8½	6½	1½	2	2	⅝	⅝	1¹¹⁄₁₆	¹¹⁄₁₆	3½	1½-18	⅝	2½	⅛	6.452	9½	1⅝	1⅝	1⅝	1½-12	2½	¹¹⁄₁₆	—	7¹¹⁄₁₆	—	¹¹⁄₁₆	4½	10¹¹⁄₁₆

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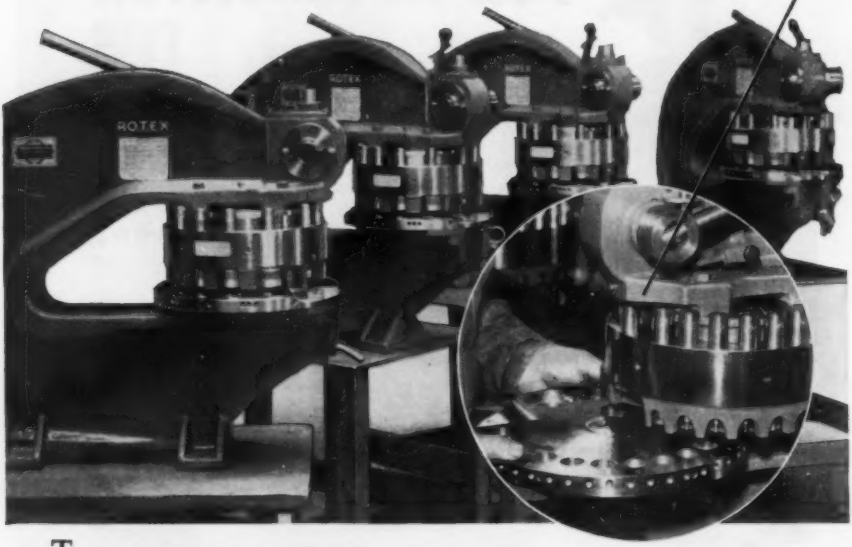

THE die turret plate of the Rotex Quick Change Punch press is machined from Speed Case Steel Plate.

This machine, manufactured by the Rotex Punch Company of Oakland, California, owes its versatility to a rotary turret—the quick change feature. The turret is rotated to the desired punch size and locked into position. The dies and punches are accurately pre-aligned to insure maximum precision.

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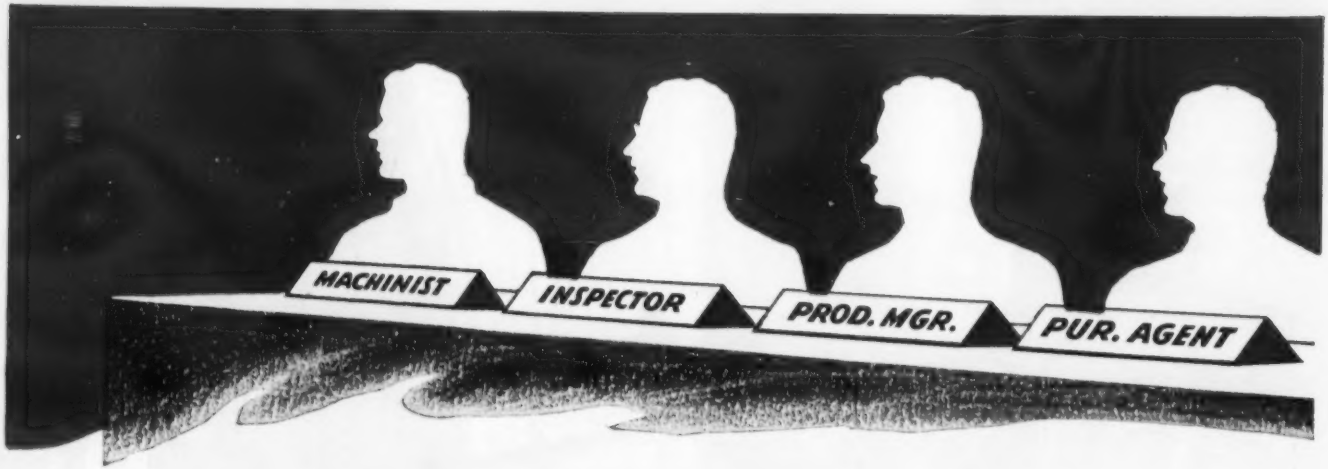
2207 South Laramie Avenue, Dept. F Chicago 50, Illinois

DANLY

DIE SETS AND DIEMAKERS' SUPPLIES



THE MOST IMPORTANT PANEL IN THE INDUSTRIAL WORLD!

This is no secret — industrial panels know that it pays to use Bath Gages because

— the quality is tops

— the measure is accurate

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— expert Bath engineering

— expert Bath engineering service is available

— they are made to American Gage Design Standards

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Bath Reversible Thread and Reversible Cylindrical Plug Gages

JOHN BATH & CO., Inc.

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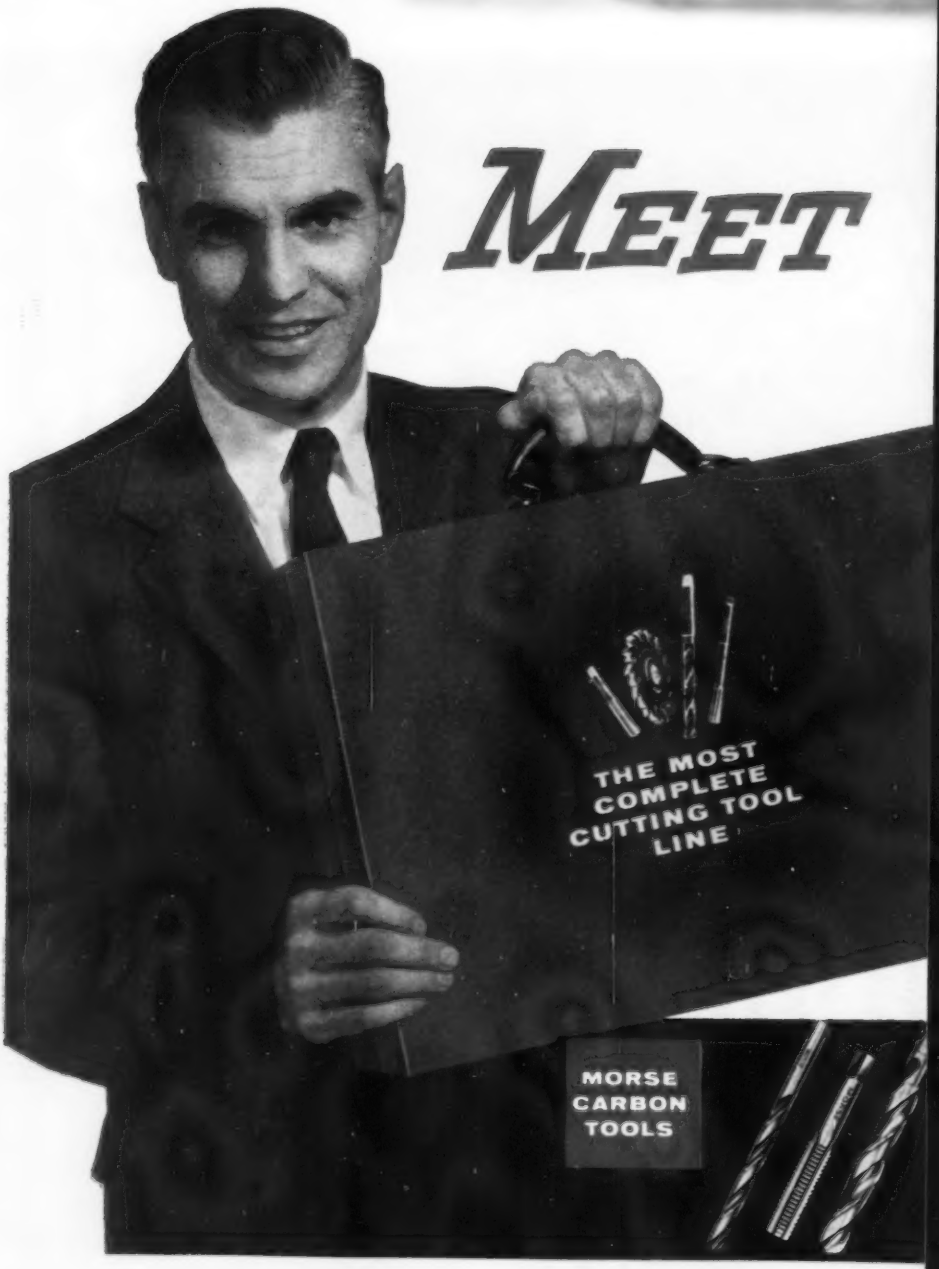
CYLINDRICAL AND THREAD GAGES · GROUND THREAD TAPS · INTERNAL MICROMETERS

Circle No. 213 on Card, Opposite Page 65


MEET
THE MOST
COMPLETE
CUTTING TOOL
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CARBON
TOOLS

"MR. MORSE"

. . . the biggest and fastest all-around man in the cutting tool industry . . . your Morse-Franchised Distributor

He's got the most complete line . . . the right cutting tools for every operation from the automated production lines of the biggest mass manufacturers, to the smallest job shop.

Carbon . . . high speed . . . tungsten carbide, tipped or solid . . . you name it and he's got it . . . *right now, when you want it! He can recommend the right tool for any job*, regardless of tool requirements. That's why Morse means "The Most" in Cutting Tools . . . because your Morse-Franchised Distributor can do *the most* for you . . . any time you call on him. So call on him today for any current requirements.

MORSE means "THE MOST" in Cutting Tools

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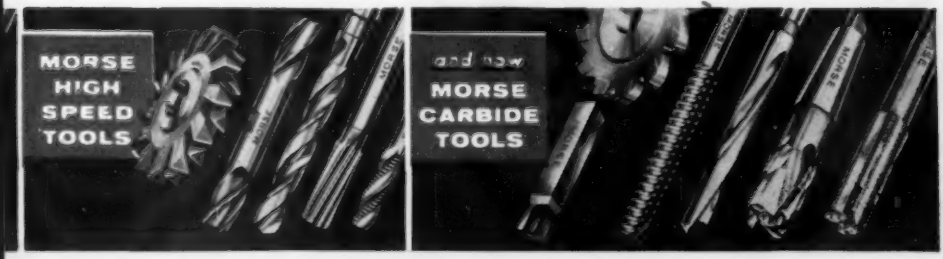


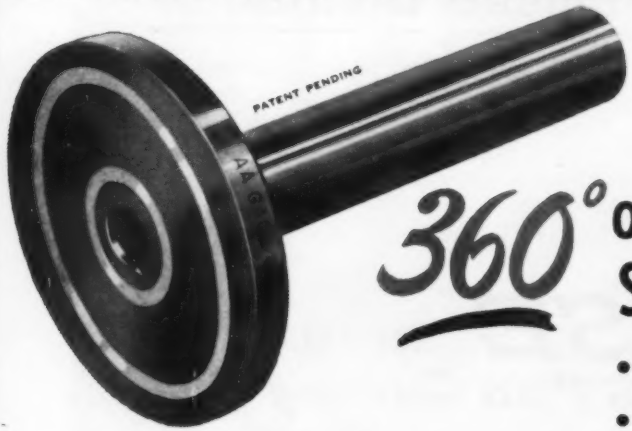
Circle No. 214 on Card, Opposite Page 65

✓CHECK SQUARENESS

in seconds

NEW!

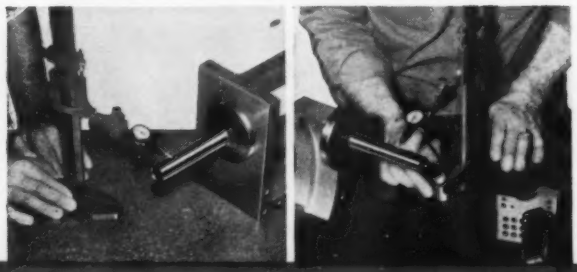
MAGNETIC CYLINDER SQUARE



360° OF ABSOLUTE SQUARENESS

- ELIMINATES DISTORTION AND TIME CONSUMING METHOD OF CLAMPING.
- YOU HAVE BOTH SPEED AND ACCURACY.
- CAN BE USED FOR ANY TYPE OF SQUARING OPERATION
- STURDILY CONSTRUCTED FOR HARD USE.
- RE-WORKING IS A SIMPLE PROCESS TO RESTORE ORIGINAL ACCURACY.
- MADE OF SELECTED STEEL TO INSURE STABILITY AND UNIFORMITY.

A POWERFUL MAGNET SECURELY HOLDS THE FACE OF THE CYLINDER SQUARE TO THE SURFACE THAT IS TO BE CHECKED.



STANDARD SIZE:

Approx. 3¾" Dia. x 6" Long—$48 F.O.B. Detroit
(Complete with Case)

ALSO AVAILABLE: 7½" Dia x 14" Long

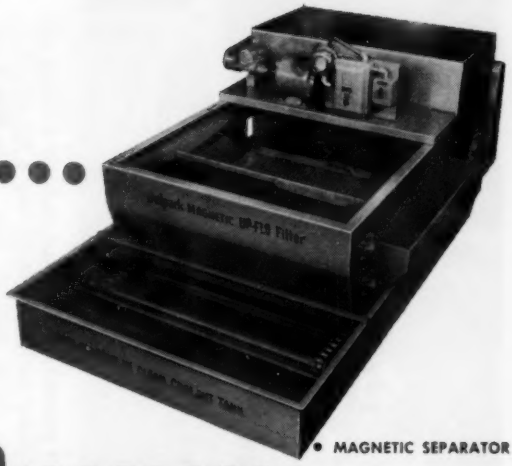
AA GAGE COMPANY

350 FAIR ST., Dept. A
DETROIT 20, MICH.

1 Unit...

3

Filtration Processes



- MAGNETIC SEPARATOR
- GRAVITY ATTRACTION
- FILTRATION

Delpark UP-FLO MAGNETIC SEPARATOR AND FILTER

...WITH PERMANENT FILTER SCREEN and 3 COMPLETELY AUTOMATIC CLEANING DEVICES

Combines the new Delpark powerful magnetic separator with a permanent filter media bar stock screen. Swarf bearing liquids flow on top of a large flat magnetic field. Magnetic unit incorporates more Alnico #5 magnets, gives twice the width of field, brings all swarf in suspension within the influence of the magnetic field, puts gravity to work in assisting the magnets and prevents washing and turbidity by using low velocity flow. This feature is particularly desirable on high viscosity fluids.

Three cleaning devices, completely automatic, remove the separated residue from the unit. Chain driven flights remove deposits from the magnetic field and the bar stock screen. .004" bar screen is cleaned by an air shaker device to dislodge enmeshed particles. A drag-out unit is built into the clean coolant tank.

Up-Flo Filters are available without magnetics for non-ferrous metal applications.

See your Delpark representative for more complete information or write.

Delpark FIRST IN FILTRATION ADVANCEMENTS

INDUSTRIAL FILTRATION COMPANY LEBANON, INDIANA

Circle No. 216 on Card, Opposite Page 65

1. Cures "stick-slip" or "jumpy table". When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.

2. Doesn't squeeze out. When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS

3. Protects expensive ways. Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.

For the lubrication of slides and ways on this machine, we recommend the use of
SUNOCO WAY LUBRICANT
a product of
SUN OIL COMPANY

4. Approved by more than 55 machine-tool builders. Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-7.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

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Cincinnati Shear's

and ACCURATE

Photos courtesy Despatch Oven Company, Minneapolis, Minnesota.

New front controlled power back gauges are now standard equipment on ALL CINCINNATI SHEARS.

fast, easy

gauge setting... *SAVES TIME!*

Cincinnati features bring speed and accuracy in turning out panels for industrial ovens at the Despatch Oven Company.

5′ x 10′ sheets are trimmed four sides corners are square, sides are clean and straight and panels are sheared accurately to size.

Cincinnati quick, convenient and positive gauging, accurate knife alignment and powerful hydraulic hold-downs speed performance.

Despatch Oven Company say "This shear has brought an operating time saving, reduced time for maintenance. Performance very good."

Write for Shear Catalog S-7.
If you shear we can help you.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

NEW! JOHNSON'S

New to the Johnson line of guaranteed Metal-Working Fluids, J-COOL is an all-purpose water-soluble Coolant. It offers:

- Efficient heat dissipation combined with new high lubricity. Tools run cooler, last longer.
- New ingredients that control rusting and corrosion even at higher-than-average dilutions.
- New "built-in" bacteriacide which kills bacteria that cause corrosion and odors.
- New profit possibilities because of superior performance that increases productivity of men and machines.

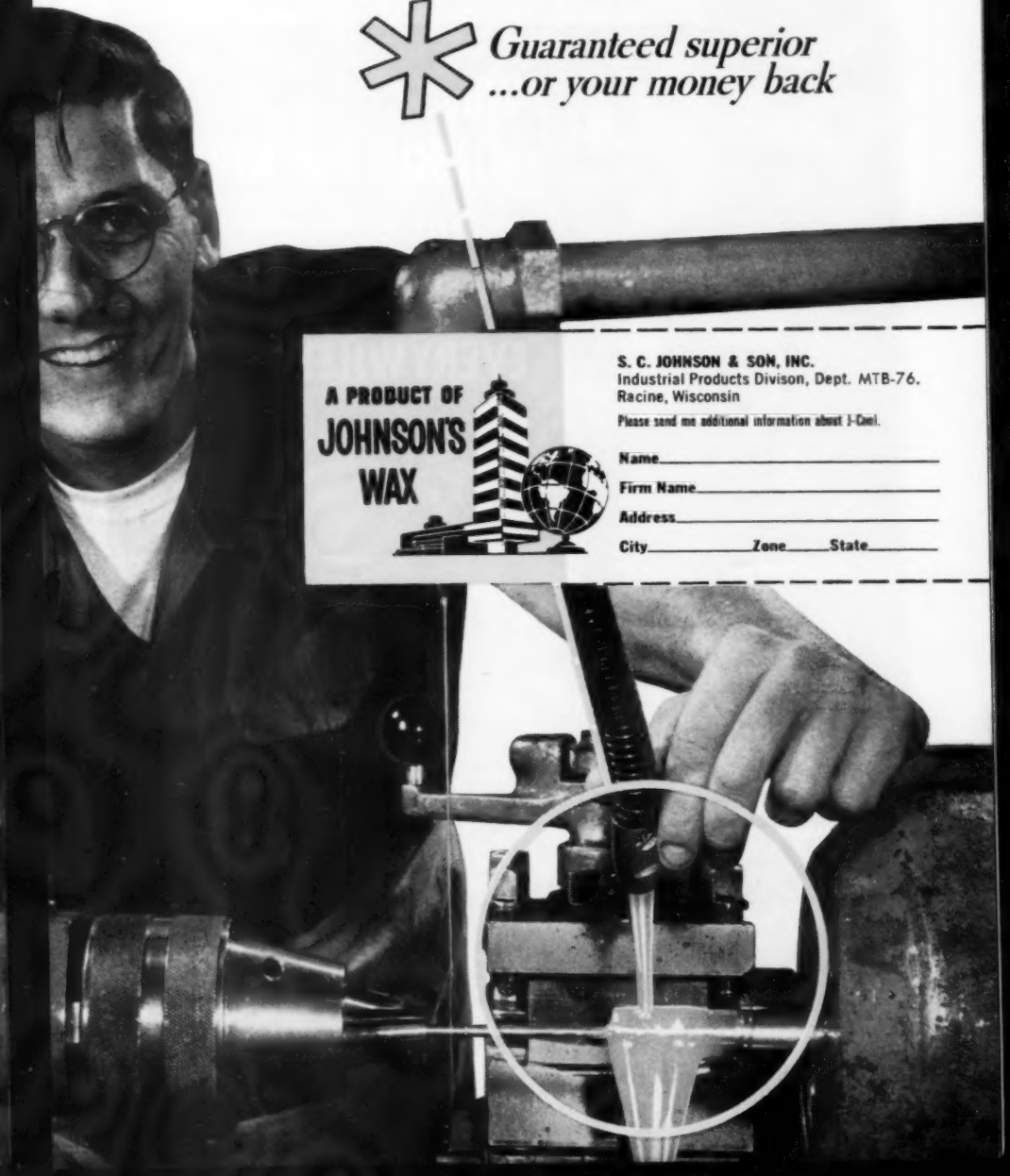
Johnson's Wax New J-Cool contains special ingredients that give you surprising new performance not found in conventional water-soluble coolants. Special compounds prevent rust and corrosion on tools, machines and parts, even at high dilutions. Downtime for cleaning and recharging is substantially reduced.

Like all Johnson's Coolants, J-Cool is GUARANTEED superior. Its full purchase price will be refunded if you feel J-Cool is not superior to the conventional coolant you are now using.

Order Johnson's Wax Coolants and Cutting Fluids from your Industrial Distributor. Or, if you wish more information about J-Cool, simply mail the coupon to the right.

WAX J-COOL

Guaranteed superior ...or your money back



A PRODUCT OF JOHNSON'S WAX

S. C. JOHNSON & SON, INC.
Industrial Products Divison, Dept. MTB-76.
Racine, Wisconsin

Please send me additional information about J-Cool.

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Firm Name_____

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ACCO products

Wilson "Rockwell"* Hardness Testers

Why WILSON ROCKWELL means accuracy, speed and economy EVERYWHERE

8" Capacity
Rockwell Hardness Tester

WILSON field service experts help make sure that—

You Get the Hardness Tester You Need
Whether your hardness tester is required for use in laboratory, tool room, inspection department or on the production line.

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for Better Value

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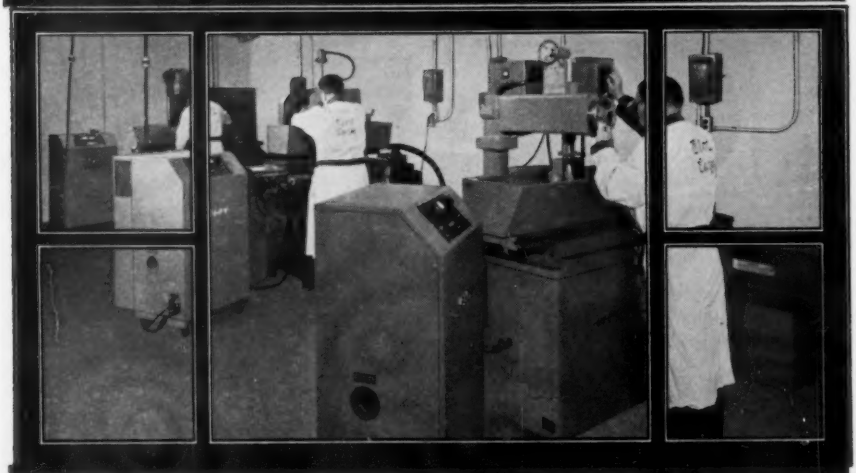
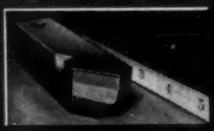
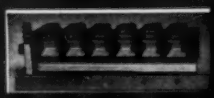
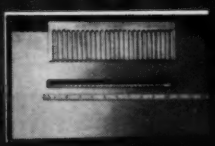




WE SAVED
19 MINUTES



WE SAVED
16 HOURS

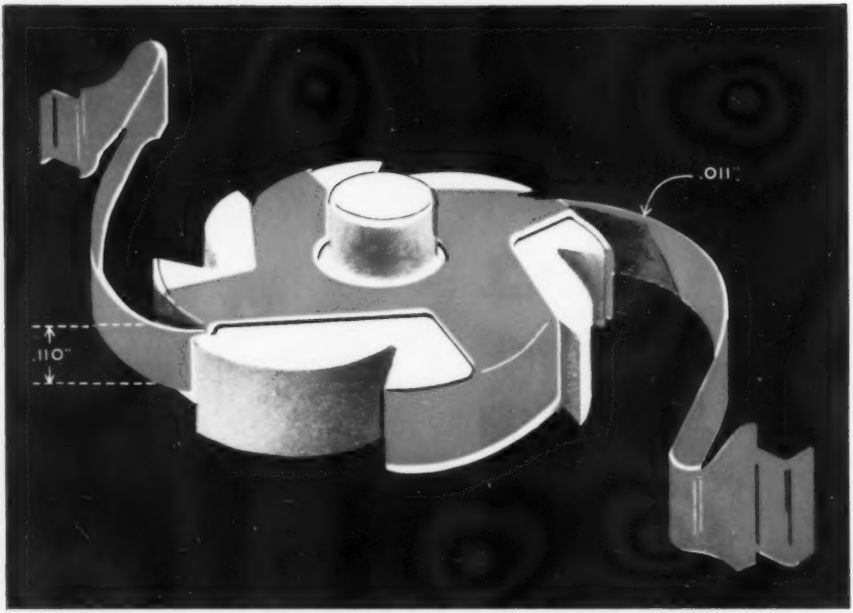


WE SAVED
379 HOURS

WHATEVER YOUR COSTS ARE
NOW . . . CONTACT ELOX

elox corporation of michigan

Circle No. 221 on Card, Opposite Page 65



Enlargement showing the contact springs at the "heart" of one model of the Levolier* switch mechanism. Levolier switches are used in industrial and commercial lighting, in heavy-duty industrial sockets, in appliances, fixtures, etc.

The Anaconda alloy tailored for this punishing service actually costs less

Cutaway of Levolier Switch No. 41 shown approximately actual size.

THE PROBLEM: The McGill Manufacturing Company, Inc., Valparaiso, Indiana, was interested in a desirable substitute for a premium copper alloy used in contact springs for their widely known Levolier switch mechanisms. Unexcelled quality had to be maintained with a new alloy that would help hold prices against rising costs. As these switches are designed for long service and heavy-duty industrial service, the spring material has to be tough and durable.

THE SOLUTION: In 1952, McGill discussed the problem of an alternate spring material with a metallurgical engineer from The American Brass Company. After an analysis of the requirements, a special Anaconda alloy was offered—Ambronze-422, rolled to spring temper.

Samples were prepared and tested by McGill and Underwriters' Laboratories. The material performed satisfactorily in standard tests—current carrying capacity, 6 amps at 125 volts d.c.—readily exceeded the requirements of 75,000 cycles, or 150,000 individual operations.

In production, the new Anaconda alloy also performed satisfactorily. It was necessary to make only one minor die-forming change. McGill received a desirable saving in material costs—product quality remained high—and the material was available as needed to maintain production.

FREE TECHNICAL SERVICE: This is another example of the Anaconda technical service available to metal users. Sometimes a new alloy is required—other times a variation of a standard alloy will do the job. The Technical Department of The American Brass Company, through its day-to-day work with a wide variety of metal problems, offers a tremendous breadth of experience, which is at your disposal. See your American Brass Company representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

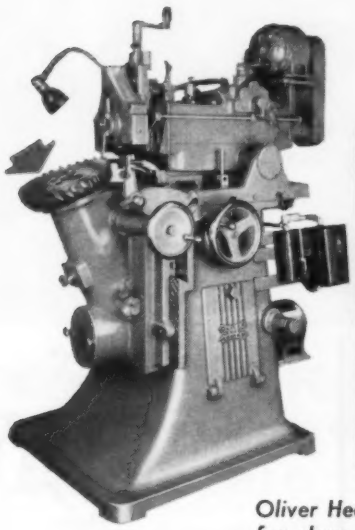
ANACONDA® COPPER AND COPPER ALLOYS

Circle No. 222 on Card, Opposite Page 65

Extremely Accurate . . .

Fully Automatic . . .
Hydraulically Operated . . .

THE *Oliver*
FACE MILL GRINDER



- EXCLUSIVE! THE ONLY MACHINE THAT AUTOMATICALLY GRINDS THE FACE, CORNER RADIUS OR CORNER ANGLE, LEAD ANGLE, AND ALL NECESSARY CLEARANCES SIMULTANEOUSLY.
- EXTREME ACCURACY . . . CLOSE TOLERANCES ARE HELD THROUGH AUTOMATIC FIXED LINE GRINDING.
- TOOL ROOM HOURS SAVED . . . GRINDS CUTTERS 6 TO 8 TIMES FASTER.
- THREE STANDARD MACHINES—CAPACITIES: 6″ to 16″ DIAMETERS . . . 8″ TO 18″ DIAMETERS . . .10″ TO 21″ DIAMETERS.

Oliver Heavy-Duty Hand Operated Face Mill Grinder for close pitch cutters and Oliver Arc Radius Cutter Grinders are also supplied. Write for complete details.

Oliver INSTRUMENT • COMPANY

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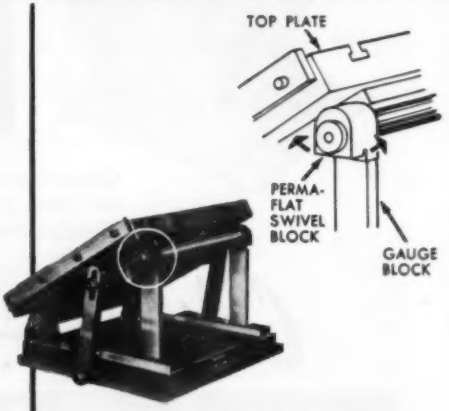
FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

Circle No. 223 on Card, Opposite Page 65

NOW! *First Major Change in Sine Plate Design in 20 Years!*

This exclusive, patented new feature in Robbins Sine Plate design means savings for every tool room! You'll save wear on sine bar rolls and costly gauge blocks, too, with the Robbins "PERMA-FLAT" swivel block, now found on every heavy duty sine plate we manufacture. The PERMA-FLAT swivel block distributes weight evenly over a large area of the gauge blocks on which it rests, rather than with the single line contact obtained using conventional sine bar rolls. Write for complete information on how Robbins Sine Plates save time and add accuracy on all angular machining and inspection set-ups.



Robbins Sine Plates make possible any angular set-up for machining or inspection to gauge block accuracy. Immediate delivery on 12", 24"—36" and 48" square models to order.

OMER E. *Robbins* COMPANY

24800 PLYMOUTH ROAD DEPT. A-6 DETROIT 39, MICH.

Also producers of special machinery, gages and fixtures

Carbide Reamers
AVAILABLE FROM
Complete Stocks

For carbide-tipped reamers—both expansion and solid types—specify Staples. These fine tools are built by skilled craftsmen now working with ultra-modern facilities in a new plant. . . . Let Staples reamers lower your production costs!

Other Staples products: Drills, End Mills, Counterbores, and Milling Cutters.

THE Staples TOOL COMPANY

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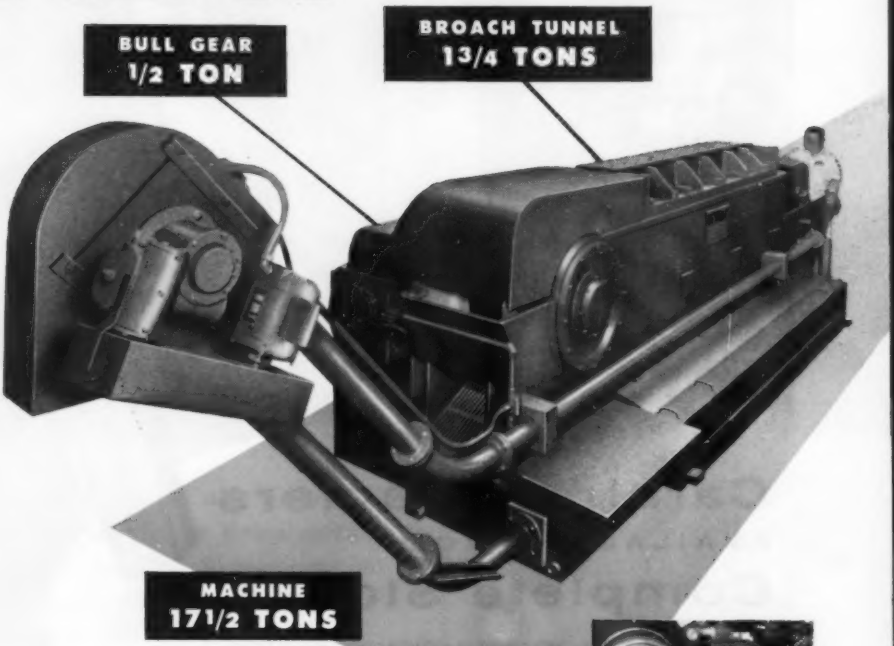
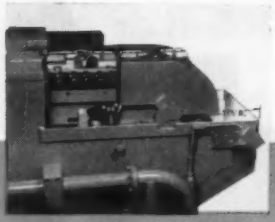
Staples

ROTATING CARBIDE CUTTING TOOLS

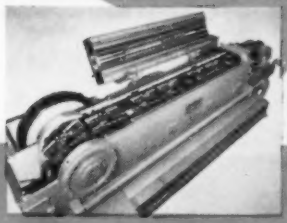
Circle No. 225 on Card, Opposite Page 65

NEW DETROIT Continuous

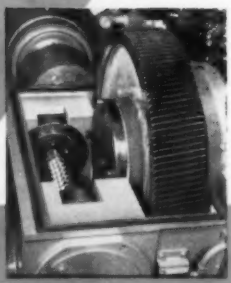




Note generous radius from chain axis to outer machine frame. 22½" at loading end, 23½" at unloading end. This assures easy, safe handling of wide variety of work sizes and shapes.



Broach tunnel raised to show heavy duty twin chain type drive and automatic hammer lock fixtures. Tunnel and broaches weigh 3,750 lbs., while entire machine weighs 35,000 lbs.



Massive ½ ton bull gear provides positive pulling power and smooth operation required for extremely fine finishes. Gear is directly connected to main drive drum.

BROACH
Horizontal Machine

WEIGHT *where you want it!*

ROOM *where you need it!*

Extreme weight and rigidity are the answers to high-production surface broaching with fine work finishes and long tool life . . . and this husky new Detroit Continuous Horizontal gives you *the most you can get!*

PLUS

- Generous loading and unloading clearances for easy, safe handling of a wide variety of work.
- All-welded, heavy steel plate frame.
- Fully automatic fixture locking, machine operation and unloading.
- Safety interlock assures proper work positioning before operation.
- Heavy-duty, twin chain electric-mechanical drive.
- Simple change gears for varied cutting speeds.
- Entirely self-contained, including automatic chip disposal unit.
- Electric and hydraulic equipment to J.I.C. standards.

Model illustrated is 90" stroke 15-ton capacity with cutting speeds to 40 f.p.m. Other 15-ton models available with 66" and 120" stroke, lower and higher tonnage capacities on request. Send part prints for prompt recommendation and quotation, or mail coupon now for free descriptive literature.

DETROIT BROACH and MACHINE CO.
DEPT. G-7
ROCHESTER, MICHIGAN
OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

DETROIT BROACH and MACHINE COMPANY,
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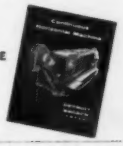
Please send me free literature on:

- ☐ CONTINUOUS HORIZONTAL BROACHING MACHINE
- ☐ Horizontal Surface Broaching Type
- ☐ Single Ram Vertical Type
- ☐ Twin Ram Vertical Type
- ☐ Pull-Down Vertical Type
- ☐ Broaching Tooling



NAME _____

TITLE _____

COMPANY _____

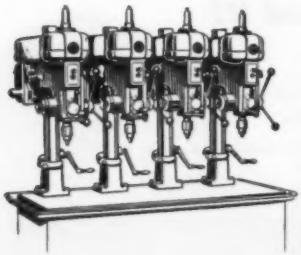
ADDRESS _____

CITY _____ ZONE ____ STATE _____

Circle No. 226 on Card, Opposite Page 65

WALKER-TURNER

6″ Spindle travel means BIG MACHINE capacity in this 15″ Drill Press!



You don't have to go to a 20″ or larger drill press to get 6″ spindle travel. With this 15″ Walker-Turner, you can drill holes up to 6″ deep at one pass of the drill, in diameters from #60 to ½″.

This extra-capacity "LIGHT-HEAVY-WEIGHT" is built to deliver fast, accurate production drilling in your plant, 24 hours a day, for a long span of years.

1300 Series — Walker-Turner "Light-Heavyweight" 15″ Drill Press — full 6″ spindle travel; six-spline, full floating spindle; speeds from 480 to 5000 rpm, depending on motor and pulleys; Jacobs Chuck, or No. 1 Morse taper available. (15″ Walker-Turner "LIGHT-HEAVY-WEIGHT" Drill Press with 4″ spindle travel — 1200 series — also available.)

Ask your Walker-Turner Distributor to *demonstrate* the big capacity of this 15″ W-T Drill Press. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and full specifications on these machines.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT
RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS
RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS
JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-turner

WALKER-TURNER

INCORPORATED
Plainfield, N. J.

Circle No. 227 on Card, Opposite Page 65

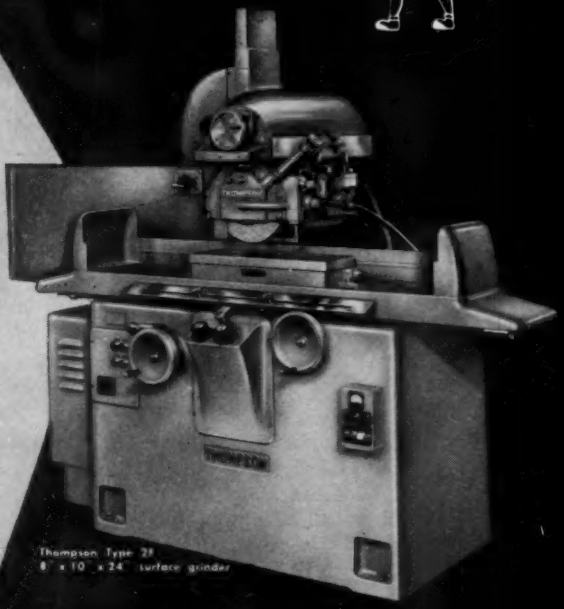
PRECISION PETE SAYS:

Only Thompson Type 2F Grinder has all three available . . .

1 COOLANT THRU THE WHEEL . . .

2 . . . COOLANT EXTERNALLY ON THE WORK . . .

3 . . . AND "IN POSITION" WHEEL TRUING



Thompson Type 2F
8" x 10" x 24" surface grinder

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SURFACE GRINDERS

WRITE TODAY FOR DESCRIPTIVE DATA

THE THOMPSON GRINDER COMPANY
SPRINGFIELD, OHIO.

Thompson SURFACE Grinders

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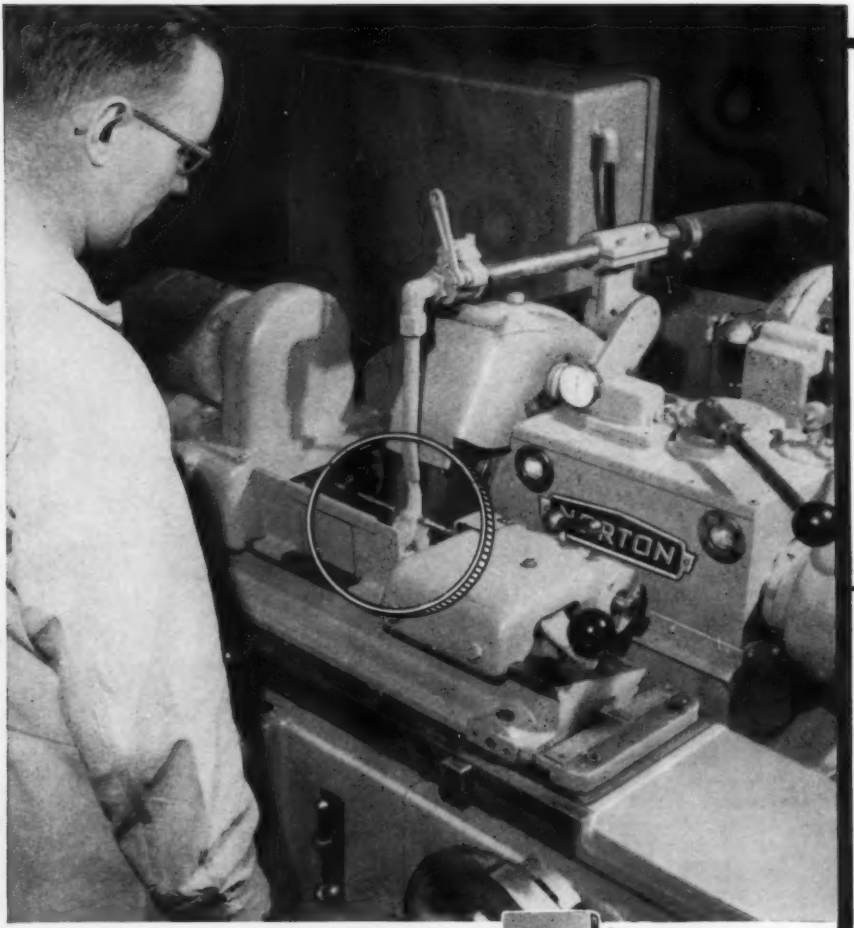
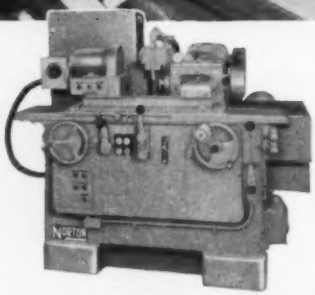


HIGH PRECISION PLUS HIGH PRODUCTION. Long-lasting accuracy is built into the 4" x 18" Type CTU cylindrical grinder — together with many Norton "Touch of Gold" features that reduce operators' duties and speed production. Remember: only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost.



Norton 4" x 18" Type CTU cylindrical grinder

makes small parts pay off big

Here's a cylindrical grinder you can get as either a Plain Machine for traverse work, or as a Semiautomatic for plunge operations.

Either way you get faster, more accurate, more profitable grinding of a wide variety of small parts. Because either way the 4" Type CTU's Norton-developed features bring a new ease of operation for your men — and a new high in production quality and quantity for *you*.

For example, there's the extremely rugged wheel spindle unit that assures enduring precision in jobs ranging from heavy stock removal to fine finishing. Then there are optional profit-boosting extras like the new SWIVALIGN Dual Electric Indicator for measuring swivel table adjustment, and an Automatic Wheel Truing Device.

Get All the Facts

on how this fast, accurate grinder can add the profit-boosting "Touch of Gold" to your grinding operations. See your Norton Representative, or write direct for Catalog No. 531. And ask about the Norton Lease and Purchase Financing Plans that enable you to modernize while conserving your capital. NORTON COMPANY, Machine Division, Worcester 6, Mass.

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GRINDERS and LAPPERS

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

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Circle No. 229 on Card, Opposite Page 65

Brand New!

haskins hask AIR Grinder...

most powerful air turbine grinder in its class!

75,000 R.P.M.
(1/5 H.P. prony brake test)

- **Permanently sealed bearings . . . never needs lubrication in air lines or grinder.**
- **Removable nose piece for deep grinding.**
- **Gyro action of turbine holds tool steady.**

Here's power—SUSTAINED POWER—like you've never experienced before in an air grinder . . . power unexceeded by any other air grinder in the same price range . . . maintains its high-speed efficiency under load! Built with a lightweight, contoured, hand-fitting aluminum housing, the Haskins hask AIR Grinder handles easily, balances perfectly . . . excellent for the most precise grinding job. Complete kit includes: carrying case, adapter hose, mounted points, dressing stone and wrenches.

for Complete details

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haskins

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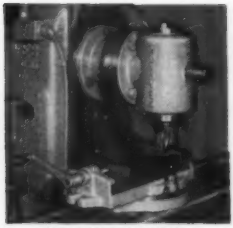
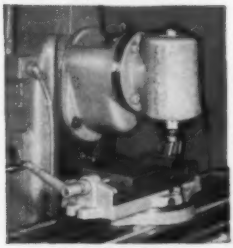
Chicago 12, Illinois

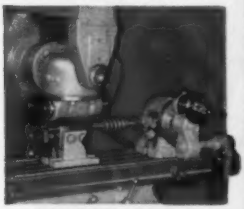
Circle No. 230 on Card, Opposite Page 65



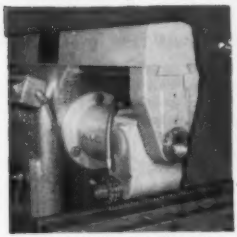
Heavy Duty Vertical Milling Attachment



Heavy Duty Offset Vertical Milling Attachment



Universal Milling Attachment



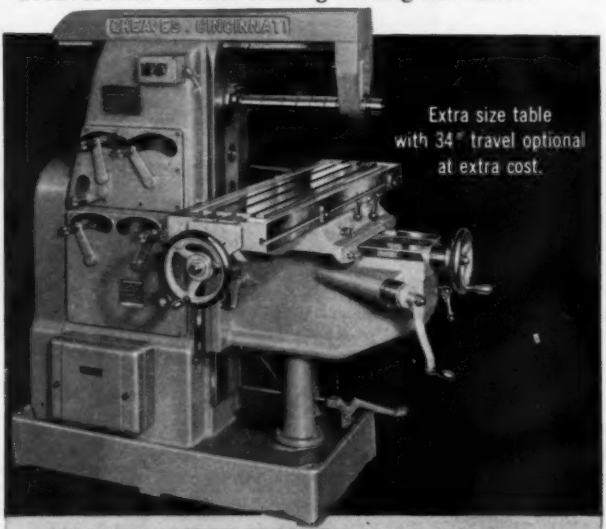
Rack Milling Attachment

Heavy duty attachments increase versatility of dependable, low-cost

GREAVES MILLS

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS.
Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table with 34" travel optional at extra cost.

Send coupon for FREE Comparison Chart and detailed descriptive literature, on easy-to-use attachments.

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___ Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.
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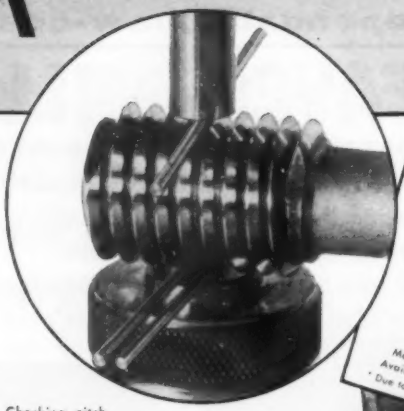
Circle No. 231 on Card, Opposite Page 65

VK THREAD MEASURING WIRES

▼ *Standard equipment everywhere*



Checking pitch diameter of thread gage by three wire method on VK Light Wave Micrometer.

VK STANDARD THREAD WIRES
Now up to 75% INCREASED ACCURACY IN YOUR P.D. MEASUREMENT
For all standard Unified and American Threads 2 to 80 P
When you order the NEW
VK CALIBRATED THREAD MEASURING WIRES WITH MATCHED CONSTANTS
Max. Theor. Meas. P.D. Error* = .00015"
Available from stock at no increase in price.
* Due to effect of wire diameter

Every set of VK Standard Thread Measuring Wires, in addition to being within .000020" of best size, is now calibrated and furnished with matching constant. In many cases this will result in considerably more accurate pitch diameter measurements. These wires are the accepted standard equipment for making pitch diameter measurements of taps, thread gages, precision threaded parts, hobs, worms, splines and gears. For the great majority of 60° Unified and American threads, the Set No. 20 H.S. pictured at the right will fill your needs. Similar sets to ± .000020" accuracy are available for single-start threads of other pressure angles. For threads which have a lead angle greater than five degrees, or multiple-start threads and worms, special size wires should be used.

Set No. 20 H.S. Thread Measuring Wires

Set No. 20 H.S. Thread Measuring Wires is a plant necessity for maintaining taps and thread gages within their limits for wear and for proving the pitch diameter of screws and threaded parts.

Price, High Speed Steel Wires....$135.00

Special wires from .002" to 2.000" diameter are made to any tolerance required.

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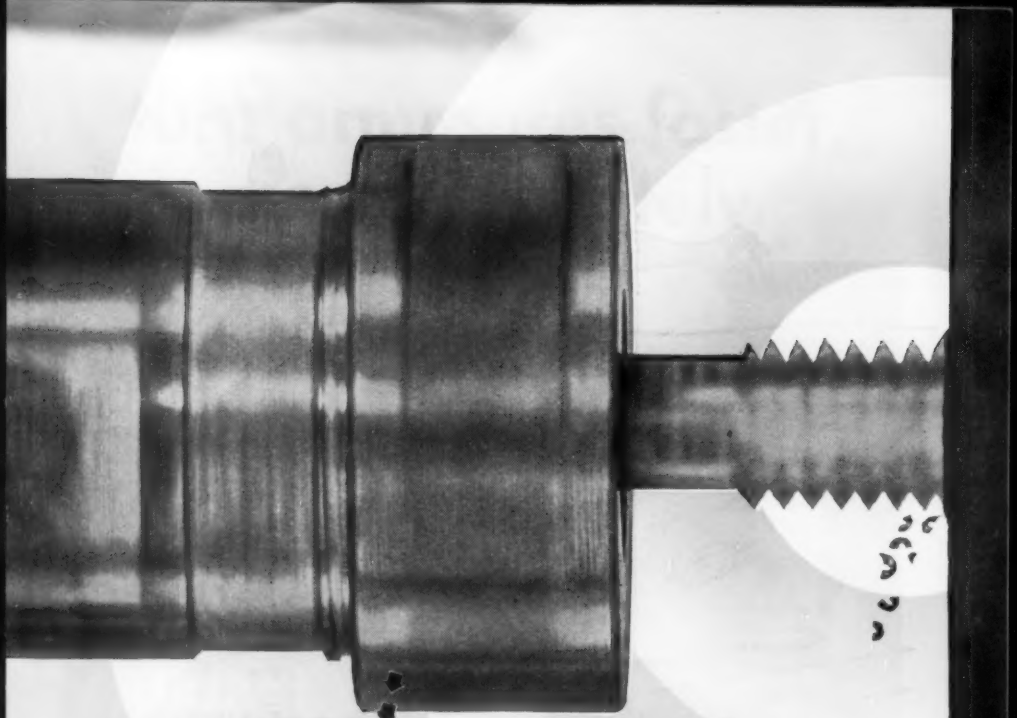
Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . . Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.

Circle No. 232 on Card, Opposite Page 65



Tops for Taps... it's a *Jacobs* CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks . . . first in service.

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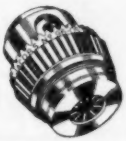
The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.

The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.

The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.

The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.

The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.

star performer

... and among high speed steels

REX is the leader

Crucible REX® high speed steel has been the winner in shop tests for more than fifty years. *And now REX is even better than ever!* For Crucible research and experience has led to improved manufacturing techniques that mean higher quality—greater uniformity.

Prove the superiority of REX for yourself—on your next job. Check it for size, structure, response to heat treatment, all-around tool performance. Then you'll know why REX has always been the *standard by which other high speed steels are compared.*

REX is immediately available at all of Crucible's convenient warehouses—or through prompt mill delivery. For a list of available data on REX and other Crucible *special steels,* write for a free copy of the "Crucible Publication Catalog." *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pennsylvania.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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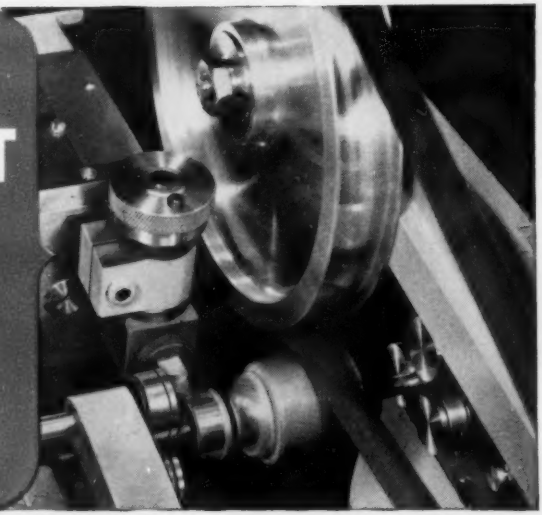
Circle No. 234 on Card, Opposite Page 65

turn armatures faster, more accurately

with the

RIVETT 1AL

armature turning lathe!



concentricity Held to .0002". Commutator turned while armature revolves on its shaft as in normal use. Depth and length of cut performed automatically.

finish Assured by rotating the armature at 7000 r. p. m., and turning with diamond or carbide tool.

speed Achieved by simple, quick method of mounting armature between two supports, bringing armature to top speed, and automatically taking cut!

Get all production facts!

11 sec. tray to tray operation described in bulletin 1AL. Write for copy today!

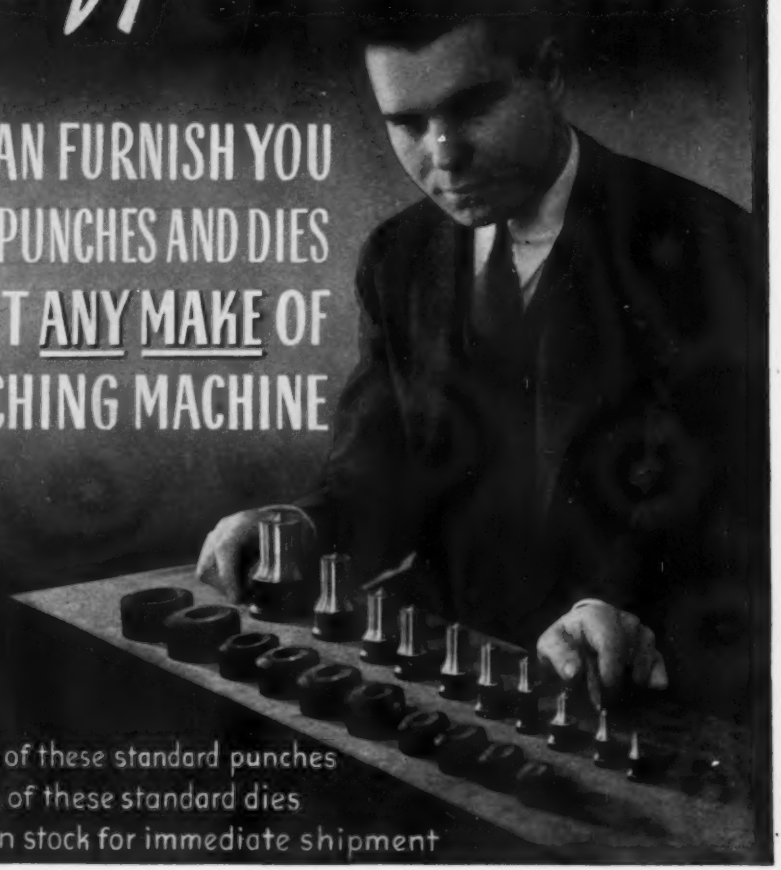
RIVETT

RIVETT LATHE & GRINDER, INC.
Dept. MTR-7, Brighton 35, Boston, Mass.

Circle No. 235 on Card, Opposite Page 65

Specify CLEVELAND'S

WE CAN FURNISH YOU WITH PUNCHES AND DIES TO FIT ANY MAKE OF PUNCHING MACHINE



399 sizes of these standard punches
241 sizes of these standard dies
carried in stock for immediate shipment

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

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City Foundry Division • Small Tool Department

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Circle No. 236 no Card, Opposite Page 65

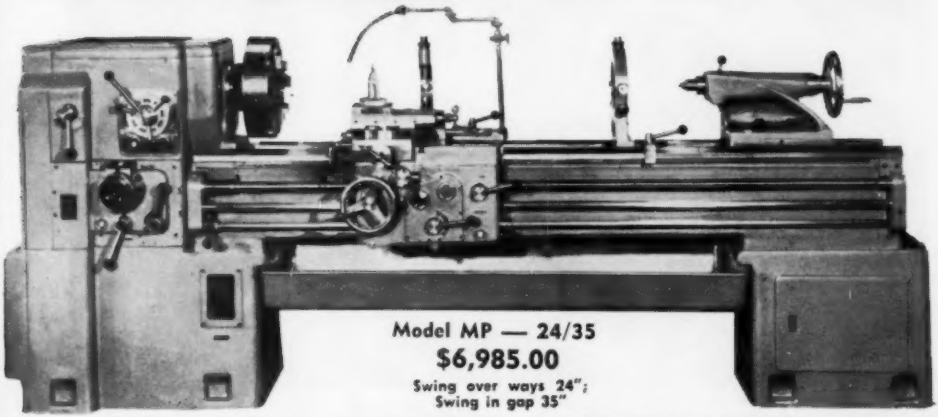
IMPERIAL LATHES

FLAME HARDENED AND GROUND BED WAYS

Precision spindles are hardened and ground, machined from chrome-nickel steel forgings.

All gears and shafts are hardened and ground.

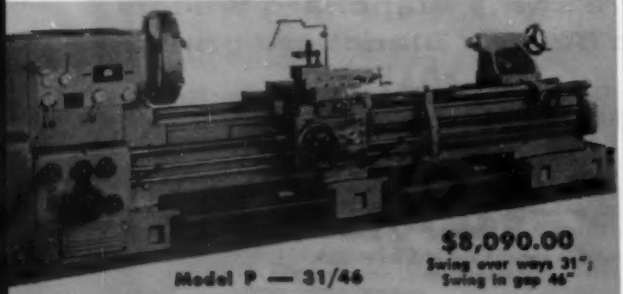
Spindle noses are standard taper key-drive type.



Model MP — 24/35

$6,985.00

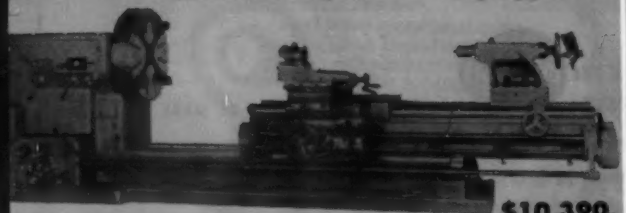
Swing over ways 24";
Swing in gap 35"



Model P — 31/46

$8,090.00

Swing over ways 31";
Swing in gap 46"



Model PS — 34/61 Sliding Bed Gap Lathe

$10,390.

Swing over ways 34";
Swing in gap 61"

"M" Series—"Pre-Selector" Production Lathes

19", 21" and 24" swing,

up to 230" centers

"P" Series-Heavy Duty Geared Head Engine Lathes

31", 34", 38" and 42" swing,

up to 316" centers

"PF" Series-Super Productive Heavy Duty Lathes

45", 51" and 67" swing,

large center distances.

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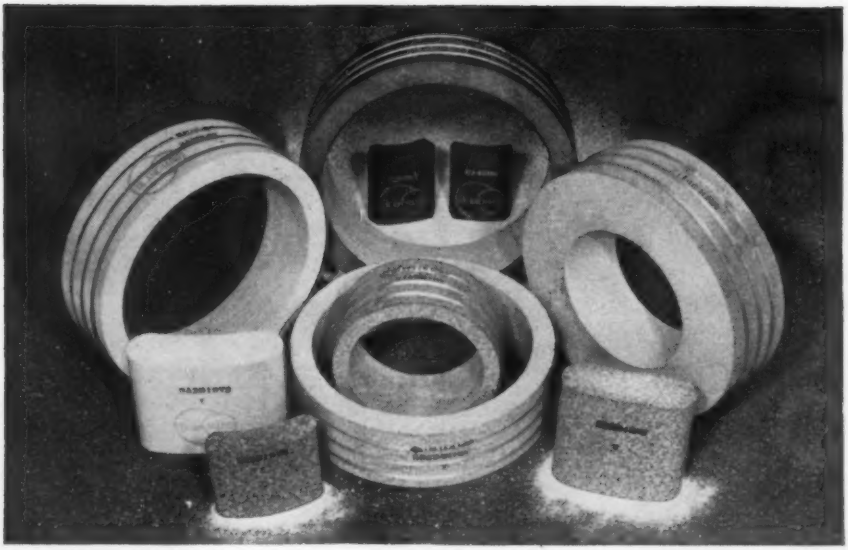

Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY **64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.**

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass. MTB

Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

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FIRM_____ CITY_____ ZONE____ STATE_____

Circle No. 238 on Card, Opposite Page 65

Automatic NUT TAPPING MACHINES

This installation *at Shakeproof, Division of Illinois Tool Works, Elgin, Illinois,* is an illustration of productivity—*with precision.*

Simplicity of set-up and lower operational costs can make your Nut Tapping Department one of the most efficient and profitable in your plant. Submit samples and prints for a comparison with your present method.

VERTICAL DRILLING MACHINES
VERTICAL TAPPING MACHINES
VERTICAL THREADING MACHINES
TWO SPINDLE MACHINES
ANGULAR MACHINES
NUT TAPPING MACHINES
HORIZONTAL MACHINES
DRILLING AND TAPPING UNITS
AUTOMATIC JIGS AND FIXTURES
DRILL PRESS TAP HEADS

SNOW
MANUFACTURING COMPANY
435 EASTERN AVENUE, BELLWOOD, ILL.
(Suburb of Chicago)

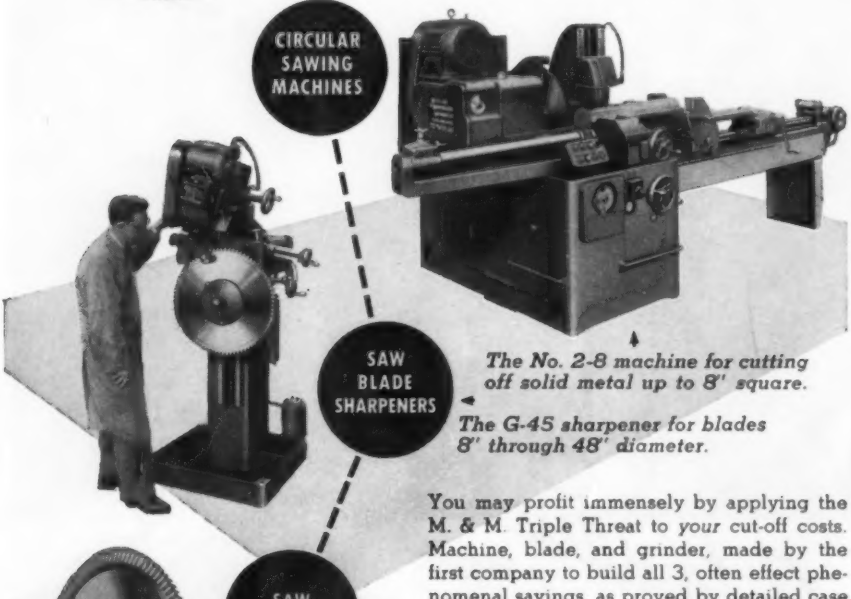
Circle No. 239 on Card, Opposite Page 65

THE Triple-Chip METHOD IS A *Triple-threat* TO HIGH CUTTING COSTS

CIRCULAR SAWING MACHINES

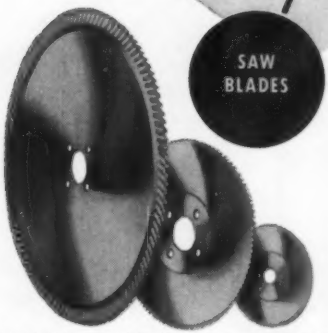
SAW BLADE SHARPENERS

SAW BLADES



The No. 2-8 machine for cutting off solid metal up to 8" square.

The G-45 sharpener for blades 8" through 48" diameter.



M. & M. saw blades cut any machinable metal. Cut-off blades: segmental — 11" through 120" diameter; solid — 8" through 20" diameter. Slitting saws — 3" through 8" diameter.

You may profit immensely by applying the M. & M. Triple Threat to *your* cut-off costs. Machine, blade, and grinder, made by the first company to build all 3, often effect phenomenal savings, as proved by detailed case studies. *Just such a study of your job is yours for the asking.* We offer you an unmatched experience in the sawing of any machinable metal, round, square or structural shapes, from 1/4" through 43" diameter.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

Circle No. 240 on Card, Opposite Page 65

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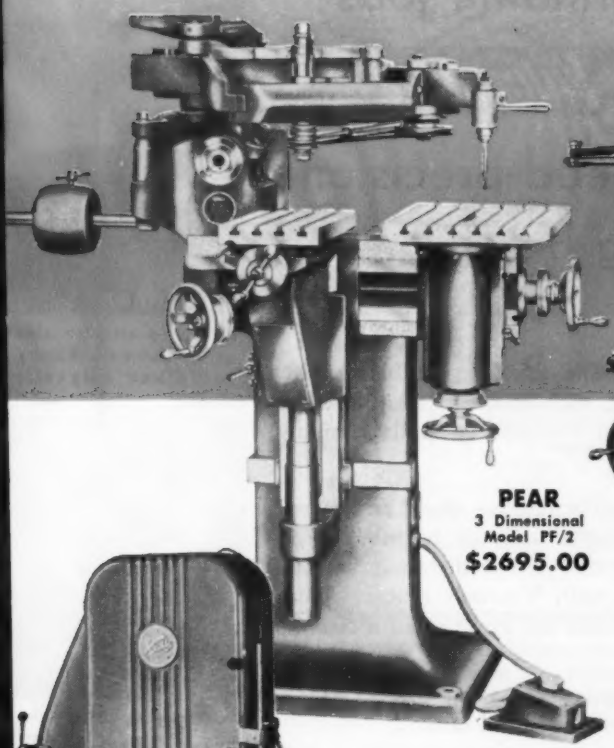

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3 Dimensional
Model PF/2
$2695.00

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2 Dimensional
Model CG/3
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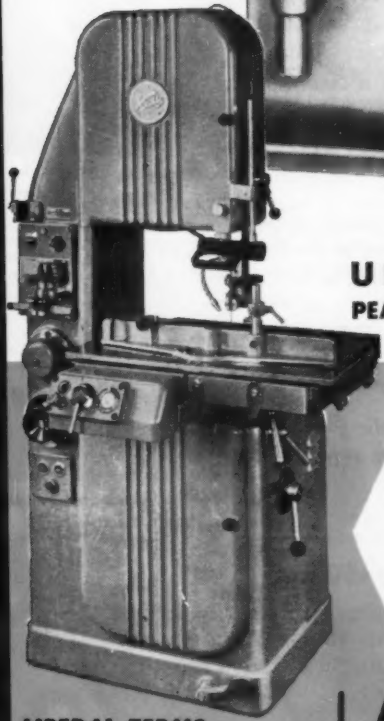
PEAR 3 and 2 dimensional Pantograph Engravers

many special accessories available.



CONTOUR CUTTING MACHINE

KOLLE MODEL K-16 VERTICAL METAL CUTTING BANDSAW

with infinitely variable cutting speeds from 33 to 2400 ft. per minute. For sawing, filing, polishing.

THE TABLE SWIVELS 15 DEGREES ON ALL FOUR SIDES!

$1695.00

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Tough grinding jobs?

Check *Vulcanaire* high speed precision grinding heads!

Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

Vertical adaptor for Surface Grinders. Grinding small slots

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.

Horizontal application Grinding a Shoulder Punch.

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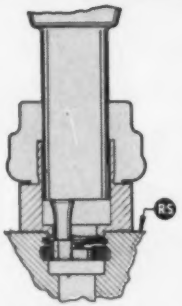
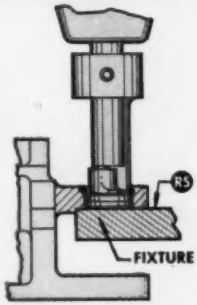
Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO. 710 Highland Avenue DAYTON 10, OHIO

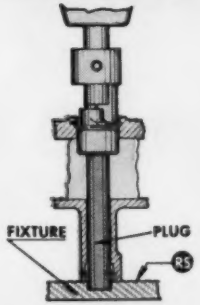
Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

Amazingly versatile! Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

Wide Cutting Range! The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

Send Your Problems to Waldes! Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool

WALDES TRUARC® GROOVING TOOL

Made by the Manufacturers of Waldes Truarc Retaining Rings
WALDES KOHINOOR, INC., 47-16 Austel Place, L. I. C. 1, N. Y.
Waldes Truarc Grooving Tool Manufactured Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.
Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool. MT078

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Company_____

Address_____

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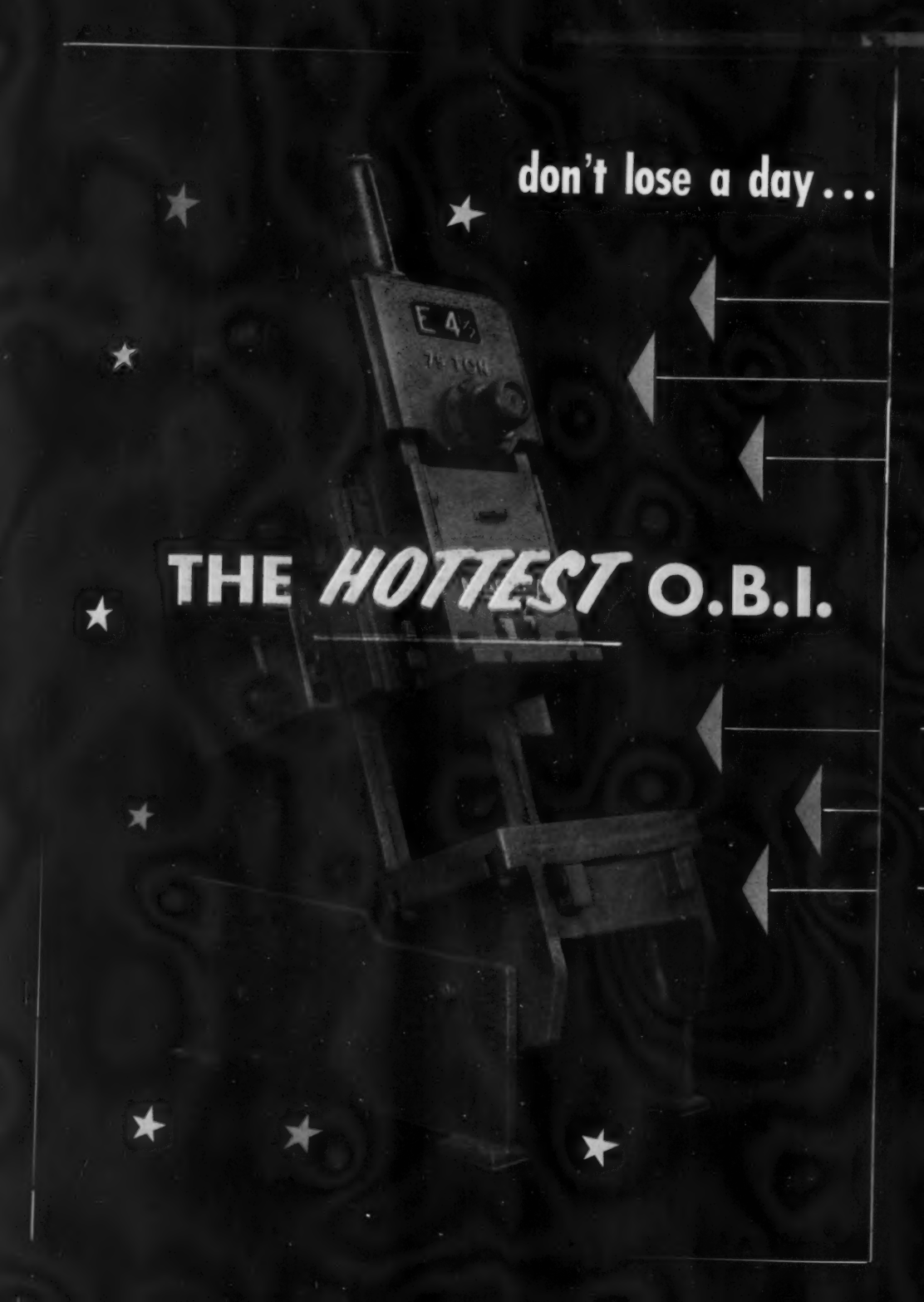
Circle No. 243 on Card, Opposite Page 65


don't lose a day...
THE HOTTEST O.B.I.

without the spectacular facts

TOTALLY ENCLOSED . . .
BRAND NEW FROM THE GROUND UP

- Rugged, front-to-back crankshaft with huge crankpin
- Fully concealed, yet accessible, driving mechanism
- Enclosed, rigidly supported gearing operates in sealed oil bath
- Electro-pneumatic friction clutch on crankshaft
- Wider spaced, longer, narrower gibs
- Wider, box type slide all within gibbing
- Precision, hardened, longer-wearing gears
- Compact, straight-line, space-saving, all-steel frame

This is it! The most talked about press in the world! The press that captured the hearts of the entire industry at the Machine Tool Show! The press that was born to do more than any O.B.I. ever built!

Get the spectacular facts and figures on this metalworking marvel . . . the all-new Niagara Series E, Front-to-Back Crankshaft Inclinable. It outmodes everything within its range (75 to 200-ton capacities, 4 ½ to 7 ½ inch shaft diameters, standard and automated models).

PRESS IN HISTORY!

STUDDED WITH SCORES OF TECHNICAL IMPROVEMENTS

- No overhanging gears, flywheel and other mechanisms
- No damaging crankshaft deflection
- Full support to wide dies — no overhang on slide
- Greater resistance to off-center loading
- Accurate alignment of slide, with minimized tendency to cock
- Substantially increased die life
- Smoother, safer press performance — simpler, thriftier servicing
- Less floorspace required

just send this...

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

Please rush new Bulletin 56 with all the facts on your brand new Series E Inclinable.

NAME _____ TITLE _____

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mtb

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26 FACT-FILLED PAGES

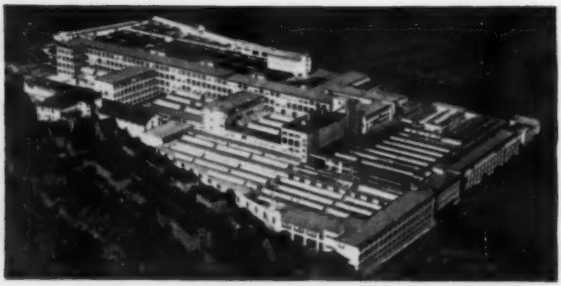
NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

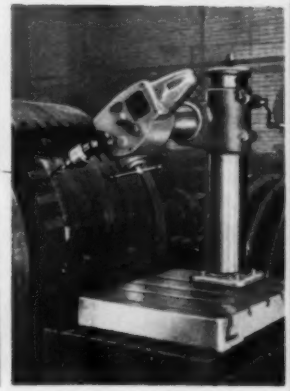
America's Most Complete Line of Presses, Shears, Press Brakes, Other Machines and Tools for Plate and Sheet Metal Work.

OERLIKON

Presenting



the range of its high class machine tools



All Angle Precision Borer UB2

Well-suited for tool room work as a stationary unit: Precision spindle roller bearings, 30 to 3000 rpm, spindle power feed, compound table, swivel head.
Unsurpassed as a versatile, portable radial drill and borer. Can be taken right to the job. Will operate in the most awkward positions e.g. while assembling cumbersome components.

Production Jig Borers

extremely sturdy design, extensive working capacities, ease of operation, combined facility for heavy cuts and high precision, adaptable for both tool room and small batch production.

Other OERLIKON machine tools

Spiral Bevel and Hypoid Gear Generators

Precision Lathes with hydraulic copying

Profile Cutter Grinders for contour grinding milling and die-sinking cutters with milled teeth by manual template copying.
Carbide Tool Grinders for manufacturing small precision carbide tools and parts in the watch, optical, TV etc. industries.

For further details apply to: **François Perret** Direct U.S. Representative of Oerlikon Machine Tool Works Buehrle & Co., Zurich-Oerlikon, Switzerland

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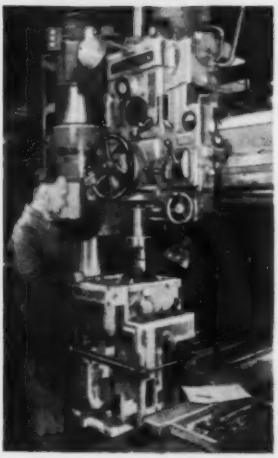
630 Fifth Avenue, New York 20, N.Y.
Telephone: CIRCLE 6-0453



Circle No. 245 on Card, Opposite Page 65

THE RIGHT TOOL ALWAYS AT YOUR FINGER TIPS

WITH CONTINENTAL COUNTERBORE SETS

CTW

It's easy to select the *right* tool for counterboring, countersinking and spot-facing with Continental Counterbore Sets! Save time and keep your tools in one handy place with any one of these three popular sets:

SET 1 — **2 holders, 13 counterbores ¼" to 1 1/16" dia., 3 countersinks, 17 pilots.**

SET 2 — **2 holders, 13 counterbores 9/16" to 1½" dia., 3 countersinks, 23 pilots.**

SET 3 — **4 holders, 21 counterbores ¼" to 2" dia., 3 countersinks, 61 pilots.**

A TWIST OF THE WRIST!

Continental counterbore driving members are designed so that the cutter can be disengaged from the holder with a *simple hand quarter-turn,* even after heaviest cuts.

56-15

Continental
TOOL WORKS
Division of
EX-CELL-O CORPORATION
Detroit 32, Michigan

Circle No. 246 on Card, Opposite Page 65

HYDRAULIC BENCH PRESSES

in 23 different models to suit your individual requirements

FOR SUCH APPLICATIONS AS

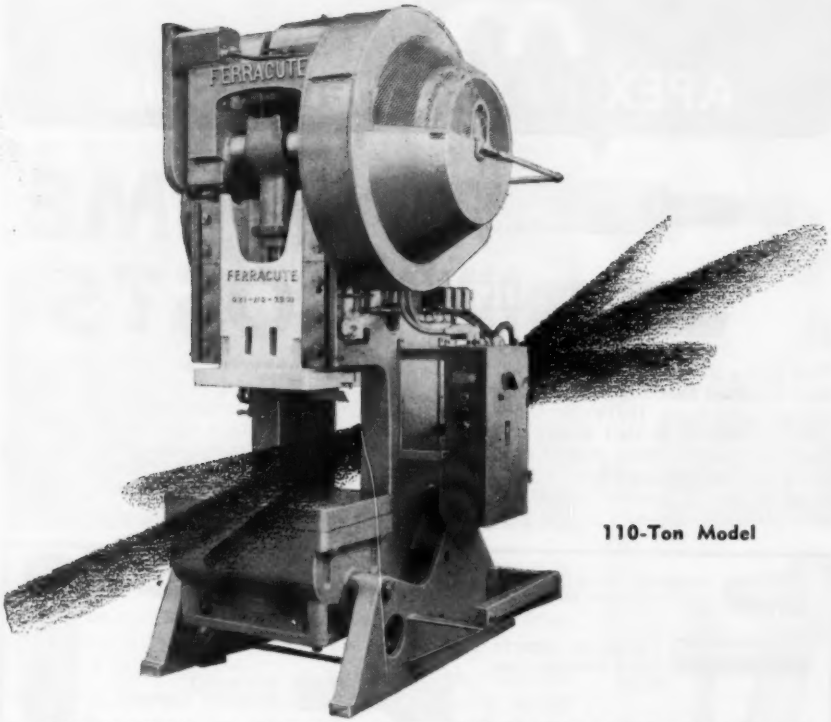
staking, forcing, crimping, trimming, bending, ballizing, broaching, assembling, punching, forming straightening, molding and many others

We are able to supply you with complete tooling for your use on most of the applications mentioned, including fixtures, index tables or work feed arrangements.

Pictured is an ACME MODEL CB8-A HYDRAULIC BENCH PRESS as arranged with automatic cycle for pressure testing of copper brazed assemblies, at the rate of approximately 1200 an hour, by a prominent automotive supplier. Operator merely places assemblies in receiver stations on the rotary table, and as the parts are indexed under the ram, a pre-determined pressure is exerted on the braze joint.

Write, Wire or Phone for Complete Information

ACME PRESS DIVISION
ACME BROACH CORP. • MILAN, MICHIGAN



110-Ton Model

• AIR CLUTCH • INTERCONNECTED BRAKE • BOX TYPE RAM
• AIR COUNTER BALANCE • DIE LIGHTING • PNEUMATIC DIE CUSHION

ON FERRACUTE

Open-Back Inclinables

Air clutch standard on models 110-ton, 150-ton, 200-ton. Air clutch optional on models 32-ton, 43-ton, 56-ton, 70-ton, 88-ton. Box type ram available on models 110-ton, 150-ton, 200-ton. Write for complete specification sheets on these high-production, low-cost FERRACUTE OPEN-BACK INCLINABLE PRESSES.

Since 1863

FERRACUTE MACHINE CO.

FERRACUTE

BRIDGETON, NEW JERSEY, U.S.A.

Manufacturers of Power Presses, Press Brakes and Special Machinery

Circle No. 248 on Card, Opposite Page 65

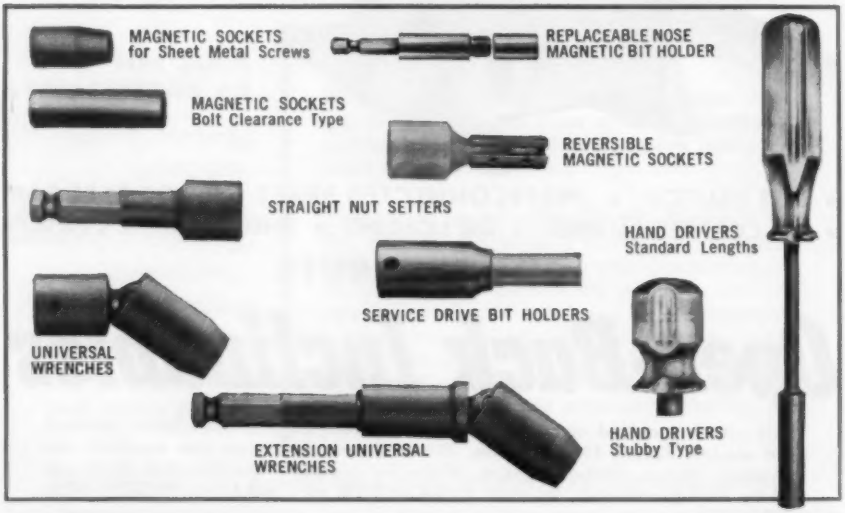
APEX Magnetic Tools

SAVE TIME

REDUCE COSTS

"Like having an extra hand"—that's what operators say about Apex magnetic nut running and screwdriving tools. There's no time lost in awkward fumbling to start screws or nuts by hand. The powerful Alnico magnet in Apex fastening tools attracts and holds the screw or nut firmly in driving position, makes it easy to drive screws or run nuts at any angle—even straight down—and in those hard-to-reach spots.

If you're not using Apex magnetic tools on your fastening operations—production or maintenance—better check right now to learn how you can make attractive savings in time and costs. Catalog 25 contains complete information; write, on your company letterhead please, for your copy.



Ask **APEX** *for the answer to your fastening problem!*

THE APEX MACHINE & TOOL COMPANY

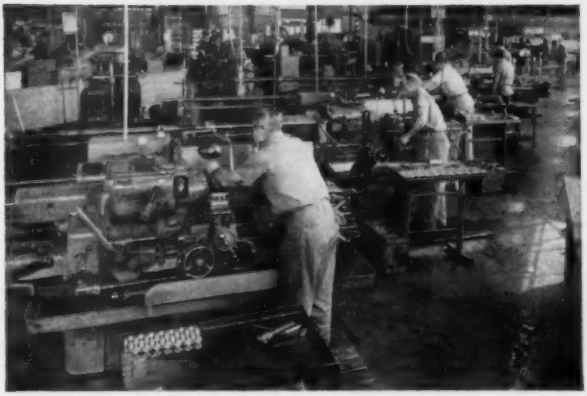
1028 S. Patterson Blvd. • Dayton 2, Ohio

Circle No. 249 on Card, Opposite Page 65

Here's a real case of

SMALL LOT PRODUCTION

on No. 3 turret lathes at CAMCO, Inc.



CAMCO MACHINES A WIDE VARIETY OF PARTS LIKE THESE IN 6 TO 100 PIECE LOTS

CAMCO, INC., Houston, Texas, depends on Warner & Swaseys for small lot production of parts for their gas lift valves—equipment which lifts petroleum from oil wells whose natural forces are exhausted.

Two of these nine Warner & Swaseys are standard tooled No. 3 turret lathes which machine a wide variety of simple to complex parts from stainless steel and monel metal, in lots averaging 50 pieces. Tolerances as low as .002 are held on most jobs.

One of the No. 3's is also equipped with a full length lead screw and selective gear box to machine numerous small lot threading jobs. The threads are chased with the lead screw and an automatic knock-off attachment.

Since the day the first No. 3 machine was installed in 1954, working two 9-hour shifts per day, not one hour has been lost because of downtime for repairs! Similar performance has been achieved by their other Warner & Swaseys—No. 4 and No. 5 turret lathes, 2-A and 4-A heavy duty turret lathes, and two 5-spindle automatics.

For dependable day-after-day production of small lots, you can't beat the versatility and accuracy of standard tooled Warner & Swasey Machine Tools!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

Circle No. 250 on Card, Opposite Page 65

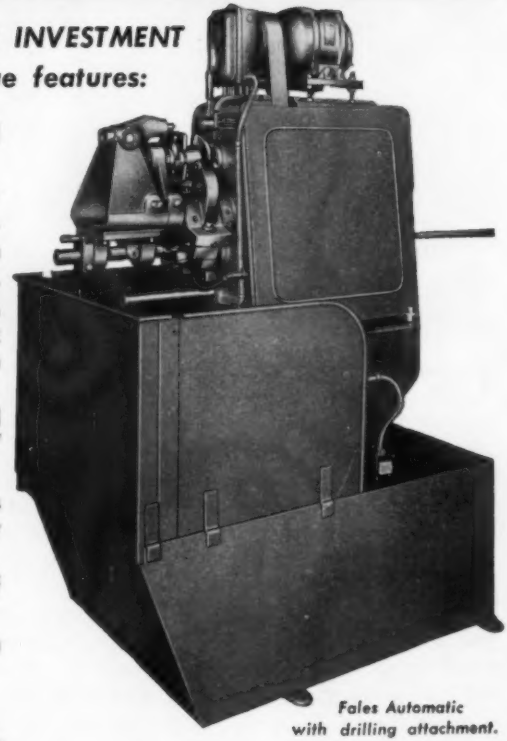
LOW COST — HIGH PRODUCTION

Fales Automatic Forming and Cut-off Lathe

(U.S. Patent 2,373,155)

YOUR MOST PROFITABLE INVESTMENT
because of these unique features:

1. Speedy production . . . rapid work cycle.
2. Chips break automatically and drop into base container.
3. Versatility of job application . . . including axial drilling.
4. Rugged construction permits heavy forming cuts on stock diameters up to 1" — with precision and fine finish.
5. Designed to handle metal and plastics up to 1" round, ⅞" hex and ¾" square.
6. Easy to operate — controls and adjustments conveniently located in front.
7. Lower cost than machines of comparable capacity.
8. Compact — requires minimum floor space.



Fales Automatic with drilling attachment.

BUILT BY FALES . . .
over 60 years experience in machine design and construction.

Write for complete details

L. F. Fales Machine Company

Northeast Street · Walpole, Mass. U. S. A.

Established 1894

Manufacturers of LUDLOW TYING MACHINES • MULTIPLE NEEDLE SEWING MACHINES • FALES and SEEYLE DIE PRESSES • PAPER SLITTERS and REWINDERS • AUTOMATIC FORMING and CUT-OFF LATHES • CLICKING MACHINES

Circle No. 251 on Card, Opposite Page 65

New! Kearney & Trecker's "Bull's-Eye" Control Grouping

Available under Tool-Lease program

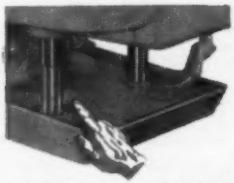
TF Series milling machine's controls are grouped up-front for "bull's-eye" accuracy . . . measurably reduce operator fatigue

One look tells why the new TF Series milling machines — Plain, Universal and Vertical—are so easy to operate. "Bull's-eye" up-front control grouping permits operators to achieve exact settings faster, more adeptly and with greater ease than ever before. This "Fron-Trol" convenience is the key to low-cost production...because it increases the operator's efficiency and measurably reduces fatigue through elimination of wasted steps.

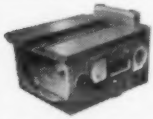
The "bull's-eye" knee and saddle-mounted controls are safety-interlocked and include feed selection, directional Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, front-mounted table handwheel, saddle clamping gib and backlash eliminator, and hand and power directional controls for knee and saddle movements.

New TF's are built in five sizes — No. 2 to No. 6 from 10hp to 50hp. You can get all the facts on TF Series machines from your Kearney & Trecker representative — or write direct to Kearney & Trecker Corp., 6796 W. National Ave., Milwaukee 14, Wis. Ask for Catalog No. TF-50.

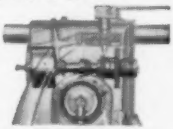
A few more of many reasons why TF Series milling machines are so easy to operate



Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of machines' much wider, heavier knee, saddle and table. This balanced design substantially increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . assures greater, longer-lasting accuracy.



Heavier, Wider Knee— *Twin Screws* support the one-piece, larger knee. Span and length of ways is increased considerably, providing greater saddle support . . . longer-lasting accuracy . . . reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life . . . quieter, vibrationless operation.

KEARNEY & TRECKER
MILWAUKEE
DESIGNERS AND BUILDERS OF
PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine inspection.

Circle No. 252 on Card, Opposite Page 65

PROTECT METAL TOOLS & PARTS IN SHIPPING, HANDLING OR STORAGE

Thermo-Cote

STRIPPABLE PROTECTIVE COATINGS provide

- **RUST PREVENTION**
- **CUSHION PROTECTION**
- **HERMETIC SEAL**

Crystal clear for instant identification or inspection. Low cost — reusable.

Gov't approval to Spec. JAN C-149.

Write for special introductory offer or send samples for free evaluation.

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219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594
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Company .....

Name..... Position.....

Street .....

City..... Zone..... State.....

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85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
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Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

...for piloted taps from stock

SEE YOUR

Threadwell

DISTRIBUTOR

FOR THE FINEST IN
CUTTING TOOLS AND GAGES

Made by THREADWELL, Greenfield, Mass.

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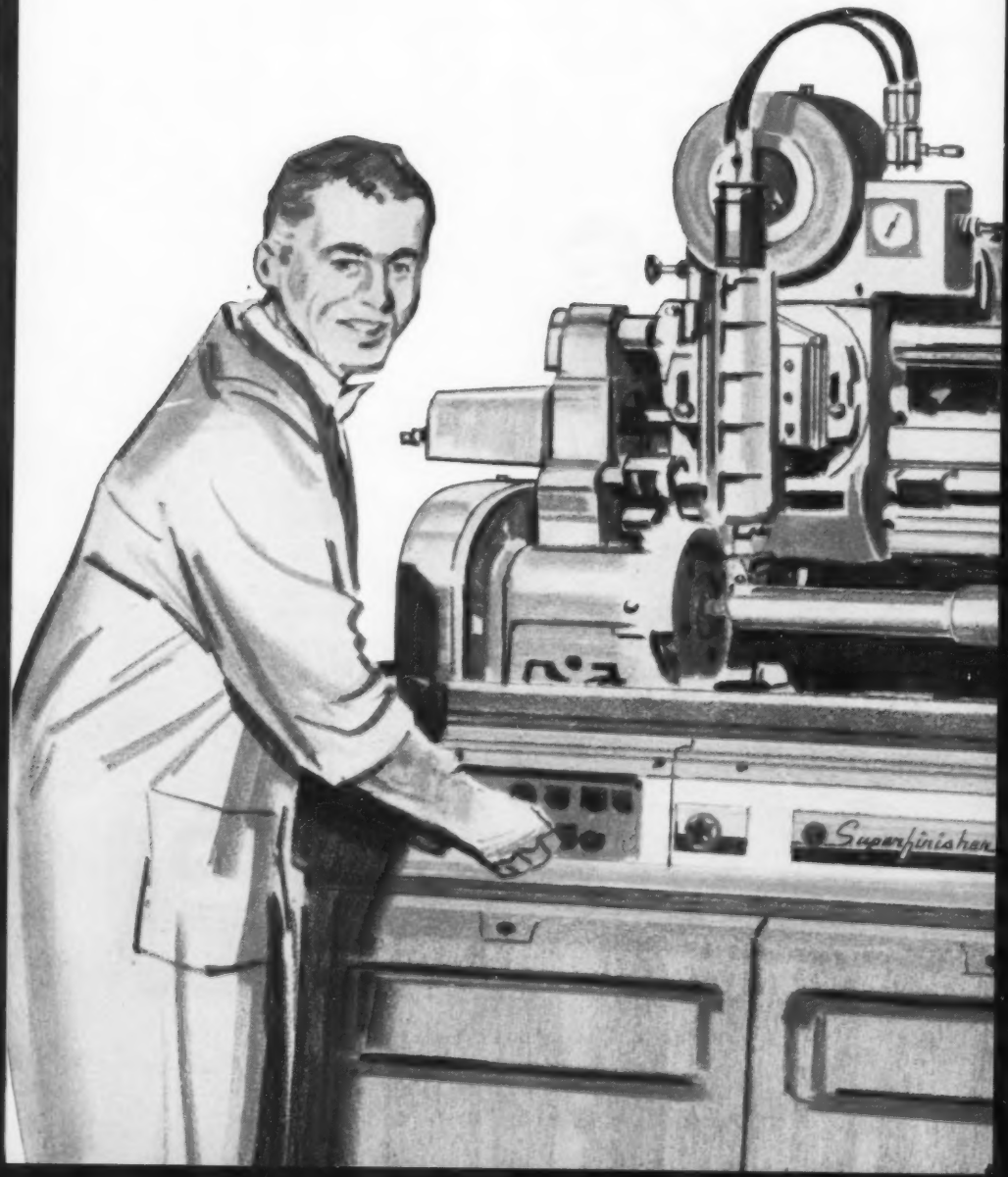
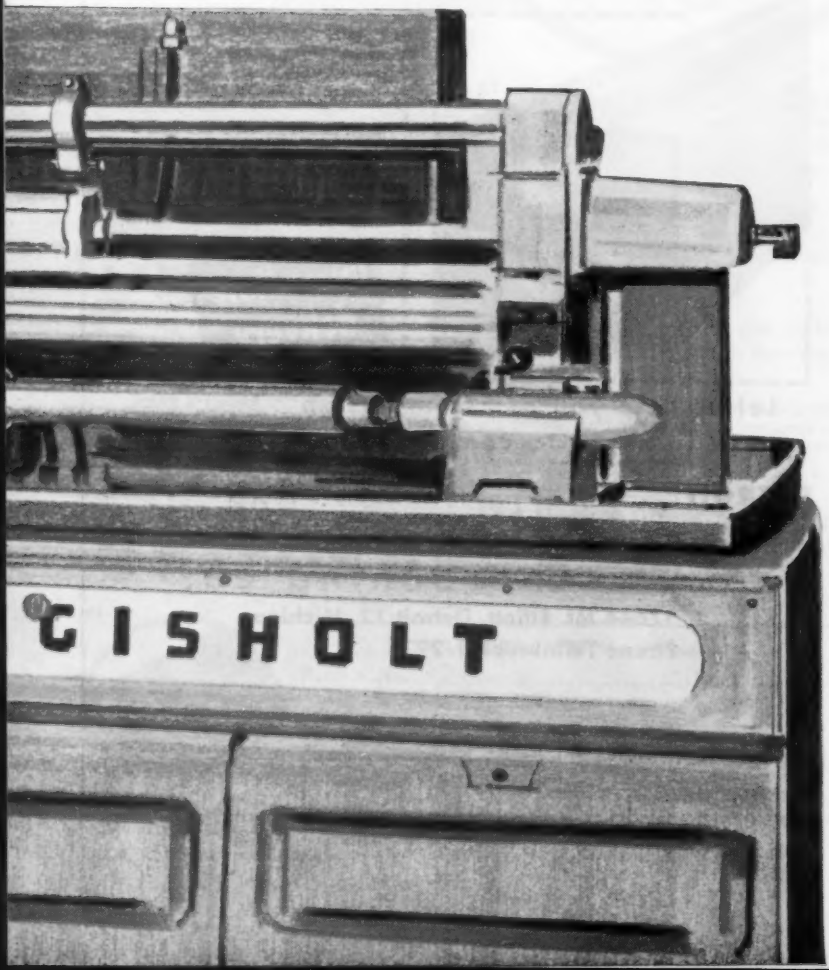
GISHOLT MASTERLINE
52A SUPERFINISHER



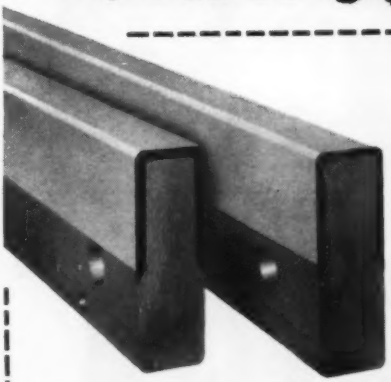
The Superfinishing process is recognized as one of the most important contributions to modern metalworking. Now—in this new 52A MASTERLINE Superfinisher—Gisholt offers an outstanding machine for either small job-lot work or high production runs. Other general purpose and high production models complete the line. Let us give you the complete facts on how Superfinishing may be profitably applied to your manufacturing processes—plus full details on the complete line of Gisholt Superfinishing Machines.

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt



flame hardened machine ways



are economical and provide . . .

immediate delivery

Let us help you . . . from design to completed machine

DETROIT flame hardening co.

17644 Mt. Elliott, Detroit 12, Michigan
Phone TWinbrook 1-2936

STOP up to 85% of Transmitted Vibration...and Cut Costs!

Unisorb will reduce up to 85% of transmitted vibration, when properly loaded. Production men are amazed to see what this means to costs:

- **Greater operator efficiency, cuts fatigue.**
- **Sharply reduces noise level.**
- **Machines keep their accuracy, last longer.**
- **Maintenance on building and machines reduced.**
- **Easy and inexpensive to relocate machinery.**

When machines are mounted on Unisorb there are no holes to drill, no bolts or lag screws. Just cement the correct grade of Unisorb to the floor and to the machine legs — in a matter of hours you're ready to roll!

MAKE UNISORB CUT COSTS FOR YOU! Send for free book which shows how Unisorb has paid off for production men in every industry. And if you want to try some right away, contact a Felters representative — in all principal cities — or write Felters in Boston.

The name to remember is

UNISORB

the **FELTERS** company

219 SOUTH STREET, BOSTON 11, MASS.

Manufacturers of Felt and Felt Products

FE6-11

Send for FREE "Facts" Booklet

Name.....Title.....
(Please print)

Company.....

Street.....

City.....Zone....State.....

Circle No. 268 on Card, Opposite Page 65

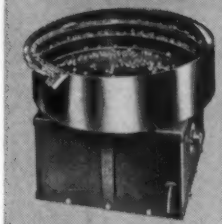
It's RESULTS that count!

Speedier OUTPUT...ECONOMY...UNIFORMITY

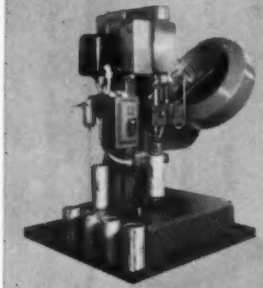
That's what you get when you use

DPS POWER METHODS on your ASSEMBLING and FEEDING JOBS

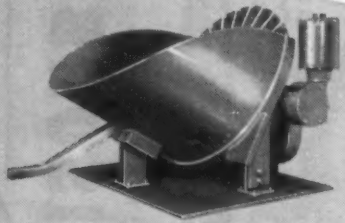
Let these mechanical helpers bring you more profitable results, *Write today, ask for catalog!*



BOWL FEEDER
Vibratory type, to select and feed smaller fragile parts

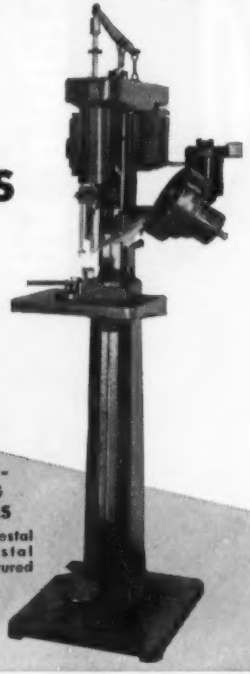


SPECIAL ASSEMBLING MACHINES
For light assembly operations using Selective Parts Feeders to feed component parts



BARREL FEEDER
with stationary ring cover, for heavy-duty, large production runs

BARREL FEEDER
Conventional type, for parts requiring critical selection



5 SCREW-DRIVING MACHINES
Bench and Pedestal types. Pedestal Model A pictured

DETROIT POWER SCREWDRIVER CO.

2809 W. FORT STREET
DETROIT 16, MICHIGAN

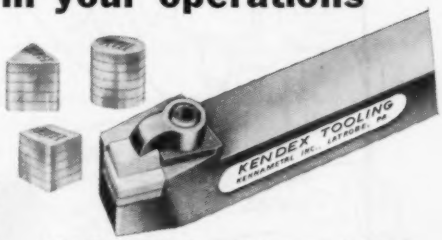
KENNAMETAL*

K7H

has a definite place in your operations

- for high-velocity machining
- for cutting heat-treated steels
- for cutting high tensile steels

Kennametal* Grade K7H is being selected by shop after shop for high-velocity cutting operations . . . chiefly because of these desirable cutting edge characteristics: High hardness (93.5 Rockwell A) combined with phenomenal strength (three times that of nonmetallics); exceptional wear resistance and maximum resistance to cratering; excellent retention of strength even at high temperatures; and top resistance to shock.



Use Kendex Tooling with turn-over inserts (available in 17 styles and over 200 tools) . . . for lowest cost per cutting edge.

HERE ARE EXAMPLES OF K7H PERFORMANCE

Doubles production: Cutting 1½" wide stators of welded laminations of 2% silicon steel, K7H has outperformed all other cutting edges by better than two to one, with 147 pieces averaged per index for K7H against only 65 pieces per index with the best competitive carbides. *Conditions:* 900 sfm, .0083" feed, and .015" depth of cut. *Results:* Higher total production at end of day, with less machine down time, less scrap, better quality by holding tolerances, and lower tooling cost per stator ($0.00109).

Outperforms ceramics by more than 30 to one in test boring SAE 1020 steel, flash hardened, length of bore 1¼", depth .025" at 900 sfm. Grade K7H cut 67 pieces while ceramics only cut two (ceramics chipped). *Result:* K7H ordered for the operation.

K7H cuts 252 pieces as compared to 30 . . . the best record for a competitive carbide in facing cut to dead center of SAE 1018 steel 5" O.D. gear blank, at 1000 sfm (at outer edge) and .008" depth of cut. *Result:* Standardized on K7H.

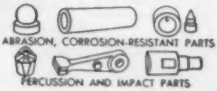
Performance 3 times greater than with competitive carbide cutting cast steel stator housing with six interruptions at 700 sfm, .014" feed, and ⅛" depth of cut. *Result:* K7H was selected for the job.

Why not discuss your machining problems with a Kennametal tool engineer. He will help you take full advantage of this remarkable cutting grade. Call him or write KENNAMETAL INC., Latrobe, Pennsylvania.

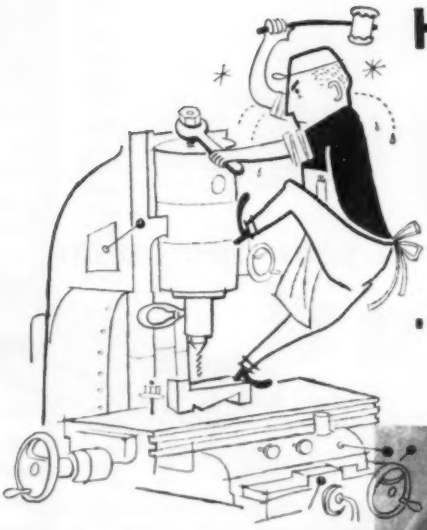
*Registered Trademark

B-5957A

INDUSTRY AND KENNAMETAL ...Partners in Progress



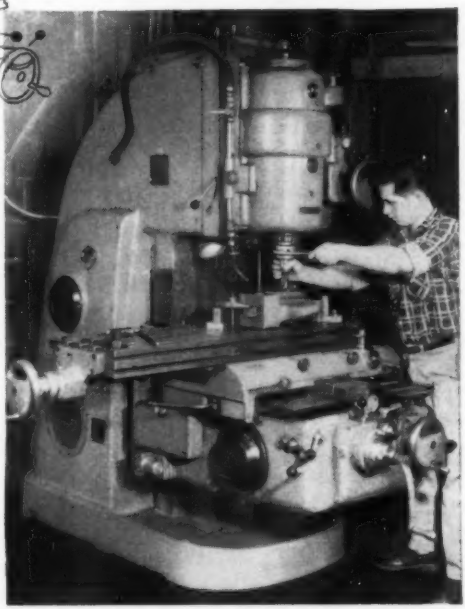
Circle No. 270 on Card, Opposite Page 65



HOW MODERN IS *YOUR* METHOD?

...THIS

... or *THIS*



The modern P.D.Q. tooling method completely eliminates the time lost in changing old fashioned type tools. No more "sweating out" loosening and tightening the draw bolt. A 60° turn of the lock nut and you're ready for another tool. P.D.Q. tool changes are only a matter of *seconds* . . . and tools are available in very small, small, medium and large series depending on the application. Write for literature covering all the advantages of modern, cost cutting P.D.Q. (Portage Double Quick) tooling.

REPRESENTATIVES IN PRINCIPAL CITIES

PORTAGE Double-Quick TOOL CO.

1037 SWEITZER AVENUE • AKRON 11, OHIO

Circle No. 271 on Card, Opposite Page 65

FEATURES THIS MONTH

MACHINE AND TOOL
blue book

What manufacturing changes in the production of automobiles are ahead in the near future? L. Irving Woolson, president of DeSoto Division of Chrysler Corporation, discusses the turbine engine, unit-body-and-frame construction, transfer line machines, 1957 model tooling and engine materials. **Page 89**

A downward revision in income tax rates is the objective of three influential members of Congress, who are working independently to eliminate as many special exemptions as possible. There are also indications that things are looking up for the small business man. See "Round-up of Washington News." **Page 82**

How Johnson Motors, makers of the well-known Sea Horse, designed a unique drilling fixture to machine an upper gear housing is reported by Editor Bill Schleicher in the lead feature article, a 10-page story. **Page 95**

How one plant realized a 30% saving in labor and materials in their maintenance department through a series of demonstration meetings in the shop is told by Harold R. Nissley. **Page 105**

At American Motors they metallize 50 crankshafts a day, and thus are able to salvage almost all of what they formerly scrapped. **Page 111**

You can get more and better holes from your twist drills. This first installment of a two-part series by Burton R. Leathley emphasizes the importance of the angle of the point, and keeping right the clearance angle of the cutting lip at every grinding to secure top results. **Page 114**

Meet the third and fourth prize winners of BLUE BOOK's $2,500 50th Anniversary Production Contest. **Page 124**

Can an employer refuse holiday pay to employees who refuse to cross a picket line? Under what conditions can you require employees to work outside their regular classifications? See "How Would You Decide?" **Page 127**

How axles for trailers are produced on an automated line is the feature of "News of Automation." Written by James M. Cairney, Hadco Engineering Co., this article won third prize in BLUE BOOK'S Production Contest. **Page 132**

Weight reduction in piston-actuated hydraulic equipment is possible with new aluminum-laminate combination. **Page 141**

CINCINNATI
BICKFORD
SUPER SERVICE
Radials

For faster metal drilling...

This ultra-modern head... CHARTS and PRE-SELECTS PROPER SPEEDS and FEEDS

Built in 4 foot to 8 foot arm, 13 inch to 19 inch column. Spindle speeds may be as low as 8 RPM or as fast as 1780 RPM.

You chart, you control, you speed up operations and have a record for reference with this advanced head. The prescheduling chart plans sequence of operations and is a complete guide for the operator. Instant, quiet, hydraulic selection and changes of 36 speeds and 18 feeds are preselected by two convenient, easily read dials. Controls for clamping of column, arm and head, and arm elevation by power are at the operator's finger tips.

Write for Bulletin R-33 describing this ultra-modern tool

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION
GIDDINGS & LEWIS MACHINE TOOL COMPANY
OAKLEY, CINCINNATI 9, OHIO, U.S.A.

The Skilled Labor Shortage and The Blue Book Contest

Judging a contest is hard going, the judges in the recent BLUE BOOK Production Contest discovered. Deciding which ten out of 200 qualified entries were best taxed both objectivity and intelligence. It is difficult to tell a man his pride and joy did not win.

The majority of entries were of high caliber. They showed amazing ingenuity and considerable tooling knowledge. Let those who want to throw stones at the technical acumen and workmanship of our men in industry put the rocks right back into the heads.

This leads us to wonder about the engineering and skilled labor shortage. Has industry tried sincerely and honestly, over a period of time, to train and direct some of the native intelligence which is rampant in our shops today? Has industry tried sending some of their brightest young men to school for abbreviated technical schooling? Has it encouraged home study for some of the more ambitious of their workers? Or have they classified all workers as unambitious and lazy?

One manufacturer has several smart young lads taking home study courses which is costing management not a penny. To put their newly-found knowledge and ambition to profitable work these lads must seek employment elsewhere, their present employer shows no interest; his only interest is to moan about the skilled labor shortage. Unfortunately he is one of many employers who want skilled technical help without wanting to pay the price of developing it.

There is too much effort being placed on buying skilled workers and research people. Is management really expanding efforts to solve this critical shortage problem? Or are they sitting back, complaining and grousing, waiting for something to happen?

We are not critical of management. It cannot be in view of the many companies with splendid training programs; ours is a questioning attitude directed toward the do-nothings.

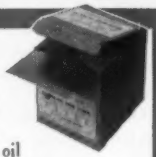
The recent BLUE BOOK contest has shown us the depth and scope of the native intelligence of many of our workers. It must be further developed and directed.

Wm. J. Schleicher

SPECIFY TOP QUALITY

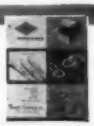
ARBOR SPACERS
SHIMS and SPACING COLLARS • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from ⅛" to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.

FEELER STOCK • Made from tempered stock, rolled to close tolerances, ½" x 25' coils packaged in transparent plastic boxes, except above .020". Strips ½" x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)



SHIM STOCK • Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001 to .032".

WRITE FOR DE-STA-CO Illustrated Brochure and Price List!



DETROIT STAMPING CO.
347 MIDLAND AVE. • DETROIT 3, MICH.

Circle No. 520 on Card, Opposite Page 65

MEETINGS CONVENTIONS EXHIBITIONS

July 25-28—National Tool & Die Mfrs. Assn. Meeting, Stanley Hotel, Estes Park, Colo. Association headquarters—907 Public Square Bldg., Cleveland 13, Ohio.

August 6-8—Society of Automotive Engineers, Inc., National West Coast Meeting, Mark Hopkins Hotel, San Francisco, Calif.

Sept. 7-9—Metal Powder Assn. Annual Fall Meeting, Homestead, Hot Springs, Va.

Sept. 9-12—National Metal Trades Assn. Eastern Plant Management Conference, Essex-Sussex Hotel, Spring Lake, N.J. Association headquarters—337 W. Madison St., Chicago 6, Ill.

Sept. 10-13—Society of Automotive Engineers, Inc., National Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee, Wis.

Sept. 17-21—Instrument Society of America, 11th Annual International Instrument Automation Conference and Exhibit, New York Coliseum, New York, N.Y. Society headquarters—1319 Allegheny Ave., Pittsburgh 33, Pa.

Sept. 24-25—Steel Founders' Society of America Fall Meeting, The Greenbrier, White Sulphur Springs, W. Va.

Sept. 25-28—Association of Iron and Steel Engineers Annual Convention and Exposition, Cleveland Public Auditorium, Cleveland, Ohio. Association headquarters—1010 Empire Bldg., Pittsburgh 22, Pa.

Sept. 26-28—American Institute of Mining and Metallurgical Engineers, Rocky Mountain Mineral Conference, Salt Lake City, Utah. Institute headquarters—29 W. 39th St., New York 18, N.Y.

Sept. 30-Oct. 4—**Pressed Metal Institute** Annual Meeting, Pocono Manor Inn, Pennsylvania. Institute headquarters—3673 Lee Road, Cleveland 20, Ohio.

Oct. 1-3—**National Electronics Conference,** Hotel Sherman, Chicago, Ill.

Oct. 1-4—**Metal Mining & Industrial Minerals** Convention-Exposition, Shrine Exposition Hall, Los Angeles, Calif. Congress headquarters—Ring Bldg., Washington 6, D.C.

Oct. 1-5—**American Institute of Electrical Engineers** Fall General Meeting, Hotel Morrison, Chicago, Ill.

Oct. 2-6—**Society of Automotive Engineers, Inc.** National Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles, Calif.

Oct. 6-12—**American Society for Metals.** Annual Meeting on Oct. 10 during National Metal Congress & Exposition, Cleveland Public Auditorium, Cleveland, Ohio.

Oct. 8-10—**American Society of Mechanical Engineers and American Society of Lubrication Engineers** Lubrication Conference, Chalfonte-Haddon Hall, Atlantic City, N.J.

Oct. 8-12—**American Welding Society** Fall Technical Meeting, Cleveland Hotel, Cleveland, Ohio. Society headquarters—33 W. 39th St., New York 18, N.Y.

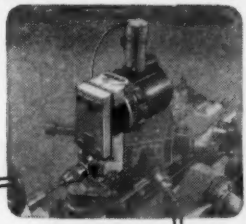
Oct. 15-16—**American Machine Tool Distributors Association** Annual Meeting, The Broadmoor, Colorado Springs, Colo. Association headquarters—1900 Arch St., Philadelphia 3, Pa.

Oct. 18-20 — **Foundry Equipment Manufacturers Association** Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters—1 Thomas Circle, Washington 5, D.C.

Oct. 23-26—**National Association of Corrosion Engineers** South Central Region Meeting, Gunter Hotel, San Antonio. Association headquarters—1061 M & M Bldg., Houston 2, Texas.

Oct. 31—**Anti-Friction Bearing Mfrs. Assn., Inc.** Meeting, Ponte Vedra Inn, Ponte Vedra, Fla. Association headquarters—60 E. 42nd St., New York 17, N.Y.

NEW DRILL SPEEDER for TURRET LATHES



★ Improves concentricity of drilled holes (neutral axis of drill and work coincide.)

★ Cuts deep-hole drilling time one-third to one-half.

★ Allows normal turret rotation at all times.

★ Speeds quickly adjustable on all models.

WRITE TODAY for complete information:
(a few territories still available)

The WARD-RIDDLE Company

Dept. BB **Ravenna, Ohio**

Circle No. 273 on Card, Opposite Page 65

TROYKE

ROTO-INDEXER

Indexing
Rapid
•
Positive
•
Accurate

CHUCK OR T-SLOTTED INDEXING TABLES - FOUR MODELS

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

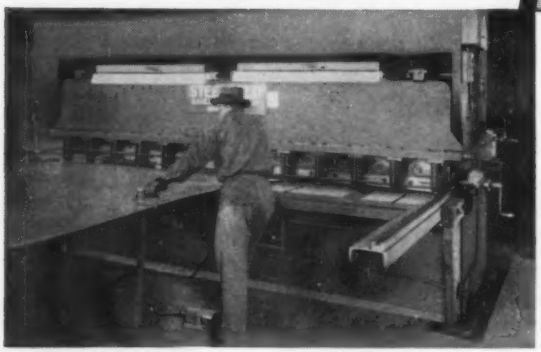
WRITE FOR CATALOG No. 20

TROYKE MFG. CO.
390 ORCHARD STREET
CINCINNATI 9, OHIO

Circle No. 274 on Card, Opposite Page 65

TOE CONTROL ELIMINATES KNEE ACTION

ELECTRIC FOOT SWITCH REDUCES FATIGUE - SPEEDS SHEARING



● The operator can slide the switch around the floor to wherever handiest to use. A mere touch of the toe and the knife is set in motion. Electric toe control is standard on all Steelweld Shears and furnished at no extra cost. It enables shearing speeds not attainable with ordinary foot treadles for many cutting operations.

● If you have spent a day at a shear with the old mechanical foot treadle, you know what knee action is. As the hours roll by it grows more and more tiresome, fatiguing, and production slips accordingly.

At last something has been done about it. Electric foot switches have been adopted as standard equipment for Steelweld Shears. Knee action has been replaced by fast easy toe control.

Toe control is one of many outstanding features you get on Steelweld Shears. These machines are in a class by themselves. Learn what they can do for you.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

5214 *East 282nd Street, Wickliffe, Ohio*

STEELWELD PIVOTED BLADE SHEARS

Circle No. 275 on Card, Opposite Page 65

LETTERS TO THE EDITOR

Measuring Instruments . . . We hope that you might be able to help us in a program which we are now planning.

The instruments and devices in the field of metrology are not only numerous today but worthy new developments constantly appear. Our accounts (and we too) find it difficult to resolve this complex picture.

It is our intention to publish a monthly House Organ Digest devoted exclusively to measuring instruments and devices and their complementary apparatus. Distribution of this paper will be restricted to our friends and accounts within the New England States. There will be no charge for service.

May we have your permission to use material which you publish? If so, could you direct a complimentary subscription of your publication to my personal attention, advising us that such is being done?

Could you suggest to us other means for gathering this information.

Our motive is of course to keep the key people of New England, who are concerned with this field, as well informed as possible and aware of the fact that Yale Associates made it practical for them to realize the advantage.

Gordon A. Yale, Chairman
Yale Associates

Complimentary subscriptions of both BLUE BOOK and its sister publication, GRINDING and FINISHING, have gone to Mr. Yale with best wishes for the success of their new house organ.

We are very anxious to secure copies of your magazine, Machine and Tool Blue Book, January 1952 and December 1954 issues. However, if you are unable to furnish copies of these magazines, could you furnish us with a photostat copy of the articles which appeared in the January 1952 issue under the heading of "Work Simplification for Supervisors", and the December 1954 issue under the heading "Incentives for Supervisors." If we can secure either the magazine or copy of these articles, we shall appreciate same very much. . . .

H. C. Schuch, Senior Buyer
Westinghouse Air Brake Co.

Squirt Welding

We are very much interested in obtaining an article which appeared on page 138 of the April 1 edition of your book. This article is entitled "Squirt

NOW...

PUSH BUTTON RADIAL DRILL OPERATION

with the All-New Morris

Hydra-Power RADIAL DRILLS

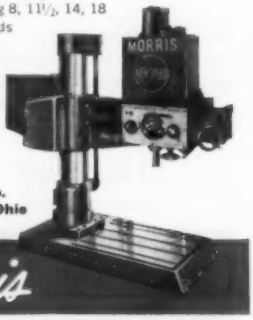
Push buttons replace conventional levers and controls to make operation of these new 13" and 15" MORRIS Hydra-Power Radial Drills the easiest and fastest ever offered!

Pushing a button raises or lowers the arm; traverses the head left or right; clamps or unclamps the arm, head or column . . . even shifts the gears in these rugged new radials!

- Completely push button controlled
- Hydraulically actuated operations
- All buttons in single panel
- Completely integrated electro-hydraulic control system
- Pre-selection of spindle speeds and feeds
- Designed for rigidity and accuracy
- Full safety features
- Hydraulic gear shifting

Other important Morris Hydra-Power features:

- Automatic tool ejector
- Built-in electric light
- Adjustable spindle counterbalance
- 36 Spindle speeds; 4 ranges
- 18 Feeds, including 8, 11½, 14, 18 and 27 thread leads



Write for complete detailed information and prices!

The Morris Machine Tool Co.
937 **Harriet St., Cincinnati 3, Ohio**

Morris

Circle No. 276 on Card, Opposite Page 65

Welding Tractor Shovel Buckets."

B. N. Smith
Manager, Welding Equipt. Dept.
Woodward, Wight & Co., Ltd.

I would appreciate very much if you would send me three tear sheets of the article entitled "Squirt Welding Tractor Shovel Buckets. . . "

Merrill F. Yale, District Mgr.
The Lincoln Electric Co.

Editorial

Will you please send us six reprints of your editorial, "These Desperate, Prosperous Times," which appeared on page 85 of your May, 1956 issue.

H. J. Miller, Owner
Miller Machine Tool & Gauge Shop

Brazing Carbide Tools

Please send reprint of article on Brazing & Cementing of Carbide Tools & Parts, as per your Sept. 1953 issue, pages 174-182, if available.

A. DeLeo
Ross Cutter & Machine Co., Inc.

Extrusion Dies

We are manufacturers of extruded aluminum shapes and have been so engaged for the past two years.

To aid us in our employee training program we are making every effort to obtain any and all books, articles and/or other available printed matter pertaining to the science and art of designing, making, breaking in, running and/or maintaining extrusion dies for producing aluminum alloy extrusions.

To date we have found practically no printed matter on the above subject. We are wondering if you have any printed material on this subject, know of any source for such printed material, or have any ideas as to where we may seek further for such material. . . .

James H. Suddeth, President
Metalmasters, Inc.

If you know of any books, etc. on this subject we shall be happy to hear from you.

We are interested in a reference book of serial numbers of metalworking machinery. Should you have such a book, we would like to have purchasing information.

Edmund Bryzgalski
Standard Forgings Corp.

The only thing we can suggest is a Directory of Metalworking Machinery published by the Munitions Board Cataloging Agency and available from the Supt. of Documents, U. S. Gov't. Printing Office, Washington 25, D.C.

Information, Please

We have a sample Malleable Iron Casting of a clamp handle, the manufacturer of which we would ask your help in determining.

A trade mark of a Keystone embodying the letter "D" is the only identifying mark.

If you can identify this trade mark please advise name and address of manufacturer. We will greatly appreciate your earliest reply.

Alvin R. Pottern
Project Engineer
Milton Bradley Co.

There is a Comparator Instrument manufactured by a Wilder Company. We are unable to locate the Wilder Company, but have been told it is some place in Connecticut. Could you possibly help us locate this outfit?

Arnold Shapiro
Sweetheart Paper Products Co.

We hope some of our readers will be able to help. • • •

ROUND-UP OF WASHINGTON NEWS

Orders Up for Tool and Die Makers. The National Machine Tool Builders Association reports that new orders received by the industry in the first quarter aggregated $296.7 million. This is an increase of approximately 60 percent from the orders received in the same period in 1955. It's the busiest season since World War II, and many shops are on a 60-hour week.

Machine Tool Sales Down 3.2%. Total Shipments of metal cutting type machine tools decreased from $74,150,000 in March 1956 to $71,800,000 in April, according to the National Machine Tool Builders' Association. This is a decrease of 3.2%. Shipments for April, 1955 were $53,250,000. Gross new orders received in April amounted to $83,500,000, a decrease of 12.4% over March 1956. New Orders for April 1955 were $52,650,000.

World-wide Steel Expansion. Some 30 countries throughout the world are expanding their steel-making capacity. Present potential: 297,140,000 net tons annually. Potential by 1960: 385 million tons. Present ranking countries: U.S.A.—128 million tons annually; Russia—50 million tons; Germany—23.4 million tons; United Kingdom—22.1 million; France-Saar—17.3 million; Canada —4.5 million tons; Red China—3.7 million tons.

Major Income Tax Revision?

Two prominent members of the House, Rep. Wilbur D. Mills (D.-Ark.) and Rep. Daniel A. Reed (R.-N.Y.), are working independently for a downward revision in income tax rates. Here are two of the most powerful tax men in Congress. Congressman Reed is the ranking Republican and former chairman of the Ways and Means Committee. Mills is the second ranking Democrat on the Ways and Means Committee and Chairman of the Joint Committee on the Economic Report. Their goal: A fairer and simpler tax system; both would rewrite the law to eliminate as many special exemptions as possible.

A similar objective is the motive behind the proposal of Senator John Marshall Butler (R.-Md.) to set up a 12-man commission to study "the impact of federal taxes on individual taxpayers, small business and the national economy."

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continued

Small Business: Things Are Looking Up

The first four months of 1956 have seen an easing of the plight of the small manufacturer and business man. For one thing, more defense and non-defense orders have been coming his way from the federal agencies. Actually some farmer and veteran agencies have promised the small business man a fixed share of the orders from their departments.

Applicants among the small business men for loans from the Small Business Administration are seeing favorable action being taken on their requests. Fifty eight percent of loan applications filed during Jan.-April were accepted compared to 38 percent in the corresponding period last year.

Truck Procurement Contracts

A forthcoming Pentagon truck building order will total about $20 million for 5,000 2½-ton trucks. Senator Capehart (R.-Ind.) and other Indiana officials immediately saw in it some life-building plasma for financially anemic Studebaker-Packard Corp. It is said that the idea was advanced by the Indiana delegation to Pentagon officials that perhaps the latter could change the specifications to assure S-P all of the truck procurement contracts. Senator Capehart would not confirm or deny this report. The senator did say that the South Bend based firm would get at least 20% of the order.

On the Plus Side. Aluminum production reached a new high in March, 1956—145,938 tons. Previous high was 140,748 tons in December, 1955. Jan.-Feb.-Mar. output of 419,094, a record, compares with 374,712 tons in same period last year. . . . Corporate profits continued to rise in the first quarter.

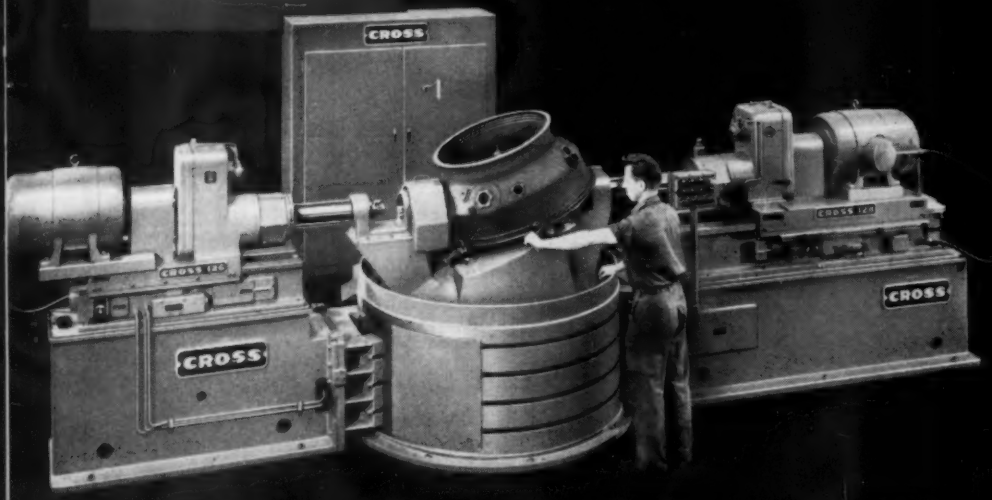
On the Minus Side. Sales of farm equipment producers have fallen to level of 1954, a comparatively "depressed" year. Reason: the squeeze brought on by dwindling farm income and increased costs.

Specks on the Horizon. Consumer installment debt is up to nearly $28 billion, up $5 billion from a year ago. . . . Manufacturer's durable inventories exceeded $27 billion in March, up 14% from last year.

Steel Outlook. American Iron and Steel Institute forecast for steel output: Down 10 to 15% this summer. Fall prospect: An upturn in both demand and output. This year should be the second best production year in history, off only "moderately" from 1955.

Precision Bores and Faces Diffuser Cases

Another Special by Cross



This Two-Way Boring Machine roughs, semi-finishes and finishes the accessory drive shaft hole of Jet Engine Diffuser Cases at the rate of 2½ pieces per hour. The operator places the part in the work holding fixture and the rough boring cutters in the boring spindles, after which the rough boring is performed automatically. Next, the operator replaces the rough boring cutters with semi-finish boring cutters and the cycle is repeated for the semi-finish boring operation. Then, the finish boring operation is performed in a similar manner and the part is removed.

The cutters are supported in live precision bearing spindles, which are in turn supported by hardened and ground steel bushings adjacent to the work.

All cutters are pre-set for size and are quickly and easily changed for the different operations.

To provide maximum flexibility for future part design changes, the machine is built with Cross Modular "Building Block" Units.

Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

continued

Air Force Awards Contracts

Major Gen. David H. Baker, director of procurement and production, Air Materiel Command, announces the awarding of nearly $200 million in Air Force contracts. Here are a few of them:

The Magnavox Co.—$5,343,067 for radio transmitters.

Continental Aviation & Engineering Corp.—$5,121,974 for gas turbine compressors, and $3,081,582 for J-69 engines.

Sundstrand Aviation Division—$1,844,187 for transmission and gear box assemblies.

Continental Motors Corp.—$1,754,409 for engine packettes.

Flight Refueling Inc.—$1,702,878 for automatic hose reel assemblies.

Minneapolis-Honeywell Regulator Co.—$9,987,654 for type MB-3 automatic flight control systems.

Lockheed Aircraft Corp.—$81,008,000 for C-130 aircraft.

Hughes Aircraft Co.—$39,405,820 for fire control systems and antenna receiver-transmitter synchronizers.

Aircraft Engine Div., Ford Motor Co., Chicago—$9 million for J-75 turbo-jet aircraft engines.

Motorola, Inc.—$2,611,385 for radar spare parts, maintenance tools, testing equipment and data.

Avco Mfg. Corp., Crosley Div., Cincinnati—$1,180,696 for fire control system apparatus.

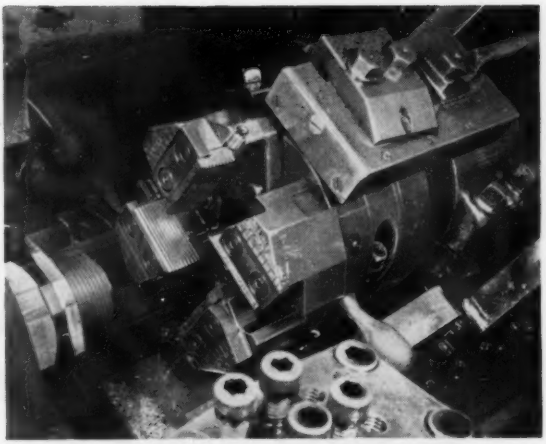
U. S. International Commerce Reaches All-time Peak

Total commercial trade of the United States for the first quarter of 1956 reached an all-time peak. And U.S. foreign trade continues to expand.

Estimates for the latest period available, January through April 1956, show non-military exports of the United States to the rest of the world totaled $5,368,000,000. This represents an increase of over 15 percent above the total for January-April 1955.

Imports for the period January through March 1956, the latest period for which statistics are available, amounted to $3,221,000,000, a rise of more than 17 percent over imports for January-March 1955. Exports for January-March 1956 totaled $3,929,000,000, an increase of 13 percent.

The healthy rise in the volume of American international commerce is a contributing factor to business activity and high employment at home and to world peace. Prospects are bright for more trade as the economies of the free nations continue to grow stronger. Secretary of Commerce Weeks believes that the United States would benefit substantially if Congress passes the Organization for Trade Cooperation. • • •



STAINLESS STEEL Tapered Threads

cut with Better Finish Longer Tool Life

1½" Tapered Pipe Threads are cut in 304 stainless steel reducing bushings at Camden Machine Company, New Haven, Conn. These threads are produced by a 1¼" LANDMATIC Taper Attachment Head on a 3¼" Gridley single-spindle automatic at 15 surface feet per minute.

The thread finish is greatly improved from previous methods and 1000 pieces are completed between chaser grinds—an increase of more than 10 times.

These improved results can be entirely attributed to the use of the Taper Attachment and the free cutting action of the Landis Tangential Chaser. Through the Taper Attachment, cutting action is limited to the throat section or chamfer of the chaser, allowing the thread to be cut quickly with little "cold-working." This action reduces cutting strains to a minimum and results in uniform tapered threads.

LANDIS Taper Attachment Heads are stationary self-opening heads for cutting tapered threads of all types. Six sizes of heads thread all diameters from ¼" to 6". Ask for Bulletin F-90.

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Circle No. 279 on Card, Opposite Page 65

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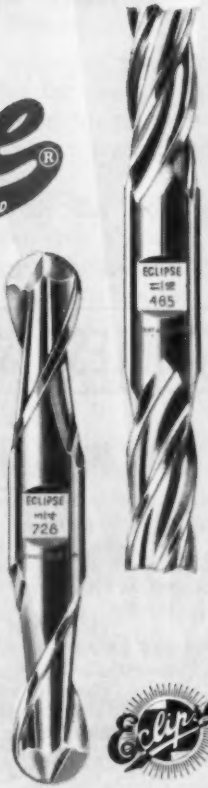

Our END MILLS have an entirely new and advanced flute design with an uninterrupted contour and hook from one flute to the next.

Flutes ground from solid hardened blanks with mirror finish allow a smooth flow of chips. Identical flutes as to dimensions and contour give a perfect distribution of cutting load. The form relieved land provides much greater strength to the cutting edge.

RESULTS: longer tool life, finer finishes, and lower production costs.

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Circle No. 280 on Card, Opposite Page 65

LEADERS OF THOUGHT IN INDUSTRY

MACHINE AND TOOL

blue book

Manufacturing Changes Ahead?

"Yes..."

... says L. Irving Woolson, president, DeSoto Div., Chrysler Corporation

In this exclusive interview, Mr. Woolson discusses unit-body-and-frame construction, the turbine engine, transfer line machines, independent parts suppliers, 1957 model tooling and engine materials

continued

Q. Mr. Woolson, quite a bit of talk is centered around unit body-and-frame construction for some of the forthcoming models. Will that offer any advantages or unusual problems in manufacturing?

A. Yes. Unit construction involves considerable revamping of plant facilities in order to go into production with it. It is entirely different from our present method of building automobiles and, consequently, our facilities would require a very extensive overhaul in order to go into any such type of construction.

Q. If companies begin using it, they would probably quit buying frames from outside suppliers, wouldn't they?

A. Yes, unit construction would eliminate the purchase of frames from an outside source.

Turbine Engine

Q. About the gasoline turbine—do you predict its introduction on the market very soon?

A. We and our competitors are doing a considerable amount of work with the turbine. It's mostly research or experimental, you might say, and from what I know there are a great many problems involved of an engineering and metallurgical nature. Frankly, I don't have any idea about how soon it will be in shape to release and build for public consumption.

Q. Some people have said that the production of ordinary piston-type engines will have to go on for quite a while after the turbines are introduced. Wouldn't that mean quite an enlargement in your production facili-

About L. Irving Woolson

The rise of L. Irving Woolson, to his top-management post indicates the importance of engineers to the auto industry and particularly to Chrysler, with its long line of outstanding engineering accomplishment. The 1926 Cornell University mechanical engineering graduate became the youngest chief engineer in the corporation at the age of 32 after serving in various departments on chassis and engine design assignments. During World War 2, Woolson supervised production of aircraft components at DeSoto as factory manager, and was responsible for reconverting DeSoto's facilities from defense work to auto production in 1946.

continued

ties, to build both kinds of engines at the same time?

A. Yes, because from what I know of the turbine engine, it is entirely different and the components are entirely different from those that go into a piston engine. Undoubtedly there would have to be new facilities for that. In my observation, I don't think that the turbine engine is coming on the market too soon, because the automotive industry is still spending a considerable amount of money in tooling for piston engines.

Q. Such as the new Plymouth V-8 plant?

A. That is right. And our competitors are also building new engine plants and increasing their engine building facilities.

Transfer Machine

Q. You were among the pioneers in the use of transfer machines here at DeSoto with your V-8 block line, weren't you?

A. We put in transfer equipment on our engine line back in 1952. Actually, we started ordering machinery in 1951 and got into production in 1952. We were not the first to install that type of equipment for an engine line although we were early in the game, and it has proved, in my opinion, to be a very good investment.

Q. What were the considerations that entered into your choice of transfer line machinery?

A. Well, the first consideration, it's the modern way to build an engine and, we believe, the most economical way to build an engine in the quantities for which we had to tool. If you were building a very small number of engines then you wouldn't, of course, consider transfer equipment. It would not be economical to do so, but with the large quantities that we have to build and supply, it is the logical way to do it.

Q. Is the primary consideration then cost of production?

A. Cost—and then there are other factors, other advantages. You get easier handling of material, less effort, less manual work involved. You get more uniform quality because less human error occurs in machining of the parts. You do require an upgrading of your labor in order to properly maintain the machinery, so there is more skilled help required. But you can see there are a lot of gains other than pure economics.

Model Changeovers

Q. Do you feel that model changeovers in the automobile industry will come more frequently now than they have in the past?

A. That's a difficult question to

continued

answer. They have been coming rather frequently in the past five or six years. I r a t h e r question whether they will be any more frequent than they have been in the recent four or five years. There might even be a tendency to go in the other direction because of the economics of the thing. The complete model change is so terrifically expensive that it becomes increasingly more important to run your parts in production as long as possible because of the tooling expense.

Independent Parts Suppliers

Q. We have been interested in reading about the discontent among automotive parts suppliers lately. Could you give us a bit of background on that and tell us how outside suppliers fit into your picture here at DeSoto?

A. We purchase a great deal of our material from outside suppliers and I am sure that we are going to continue to do that. I think that our suppliers must develop all the economy that is possible, just as we are doing, because of the competitive situation in the business. And I am sure that all our good suppliers are doing everything in their power to develop the proper methods and techniques in order to reduce their costs, so that they can be competitive and stay in business.

Q. Do you feel, then, that the future of the parts suppliers is pretty secure?

A. If he keeps abreast of the times, I see no reason for him to be concerned about the future. I think the automobile business is going to expand, and the suppliers that are on top of their business are going to expand and develop with the automobile business.

Q. What do you buy from independent outside suppliers?

A. Some of the bigger items that we buy on the outside are frames, all of our electrical equipment—generators, starting motors, distributors, spark plugs, things of that type—are purchased on the outside. All of our die castings and decorative materials are bought on the outside and, one other big item, interior trim cloth and that type of thing. We also purchase many parts from other plants in the Corporation, such as transmissions, axles, steering gears, and front end and suspension parts.

1957 Model Tooling

Q. Can you tell us about any planned innovations for your 1957 model tooling?

A. Well, I can perhaps tell you a little. We are adding more automation equipment in our press plant. As p e r h a p s you know, DeSoto operates a fairly large press plant in which we use about

continued

500 to 600 tons of steel a day and we are going further into automation on many of our lines. In our body plant we are converting our body and weight setup to a gateline method of framing the bodies, which is quite an improvement over the older method of framing the bodies in one solid fixture.

Q. We understand that a certain amount of decentralization within Chrysler Corporation has been going on, putting the divisions on an independent status. Has that affected your tool planning groups and process engineers to any extent?

A. It has affected them to the extent that we now have our own estimating department which works very closely in conjunction with our process engineers and tool engineers in determining the best and most economical way to make a part. We also have our own purchasing department now, and they in turn are always comparing outside prices with prices of the parts the way we can produce them. In that way our people are brought to develop better methods in our own plants.

Engine Materials

Q. Will there be an increased use of cast iron in engine parts—camshafts, crankshafts, and so on?

A. Well, of course, cast iron camshafts have been used for about 20-25 years. They were one of the first developments in castings. Cast iron crankshafts, while they are not new, are not so widely used. There is a lot of development work going on on them and they are used by some companies, but we do not use a cast crank. They have some characteristics which are not too favorable and, secondarily, the engine has to be designed specifically for use of a cast iron crank. It is not a simple case of substituting a casting for a forging.

Q. Do you think the die-cast aluminum engine block has a future?

A. Yes, I do. There is a lot of development work going into that right now. That, again, is in its infancy and requires a great deal of development work before it will be ready to go into production. And you have got to design your engine for the use of die castings; you just can't substitute a die cast block for a cast iron block.

Q. That would tend to reduce front end weight and give you a better balanced car, wouldn't it?

A. It would be a very nice thing to have because of the weight reduction. It's expensive to haul around a lot of pounds of metal and every engineer dreams of reducing weight in every place he can. • • •

NEW COLOR CODE

for steel identification

More logical system aids quality control

Accurate identification of steel —always a point of paramount importance with Ryerson—now becomes even more meaningful than before with the introduction of a new system of color marking.

Based on logical groupings of related types of steel, this new Ryerson color code is easy to understand, remember, and use. It strengthens still further the rigid program of quality control that for years has guarded the known high uniform quality of Ryerson Certified Steel.

Here's how the system works:

1. Single colors are used for standard Carbon and Carbon Manganese Steels.
2. The colors GREEN, BLUE, YELLOW AND PINK always define Carbon content.
3. Centered dots of these Carbon colors always indicate the heat treated condition.
4. Centered dots of other than Carbon colors identify characteristics other than analysis, carbon content or the heat treated condition.
5. PURPLE, BLACK, WHITE, ORANGE, GOLD and BROWN each designate a related group of steels.
6. RED marking of any kind always indicates Special Ground Finish.

If you do not already have this new steel identification chart, we will be glad to send a copy (printed in full color) for your Ryerson Stock List. Call or write your nearby Ryerson plant, or write Box 8000-A, Chicago 80, Illinois.

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Circle No. 281 on Card, Opposite Page 65

MACHINE AND TOOL
blue book
JULY—1956

HOW JOHNSON MOTORS GOES ABOUT . . .

Building Their Own Special Machines

. . . to up production, cut costs. Come with us on an informal tour with R. E. Medeen, master mechanic, explaining the set-up

By **William F. Schleicher,** Editor

• R. E. Medeen is master mechanic at Johnson Motors, Waukegan, Ill., a division of Outboard Marine and Mfg. Co. To many of you fishing and boating enthusiasts the name Johnson Sea Horse is a fami-

continued

liar trade name, and having spent some time in the Johnson plant let me say the Sea Horse is produced as efficiently as it performs in service.

"We've been busy here for the last fifteen years," Mr. Medeen remarked, "I can't remember when we weren't pushing to produce more. There's been no slackening of demand for the Sea Horse; I sometimes wonder what people do with them all."

"With this constant demand for more units you must have made many changes in your production methods, or did you add to the labor force?" we asked.

"Yes, we have added to the force, but not in direct proportion as we increased production. Most of our production increases result from tooling changes; however, we were greatly helped by maintaining our own die casting plant, which is one of the most modern in the Midwest.

"All the die cast parts produced in the Waukegan plant are aluminum. Many ferrous parts are produced either in Milwaukee or in Galesburg, shipped here and assembled into the finished products. Because the dies and the castings are made here we are able to effect design changes quickly or accommodate new models. But aside from that, in our machining practice we've tried to make improvements wherever and whenever possible. Let's look at this unit which machines the Upper Gear Housing of one of our models."

This is a Johnson designed and built machine, replacing a number of vertical milling machines and several men who went to other departments.

There are a number of machines of this type in the plant, all operating on the same principle. To show how they operate we want to explain this particular machine in more detail.

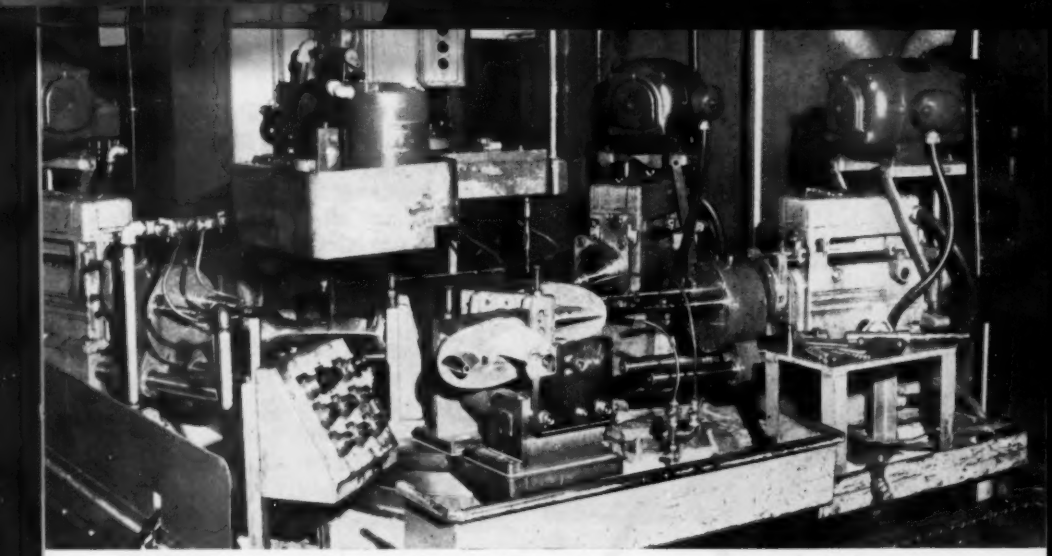
A general view of the setup can be gained from figure 1 which shows the gear housings in position in the fixture. This is a rough casting and is the second machining operation performed. (The first takes place on a Simplex boring machine.) A simplified drawing of the part is shown in figure 2. A sketch showing location of the drill heads, operations performed and the various stations is figure 3.

The sequence of operations:

Station No. 1, vertical head, drills two holes and spotfaces another;

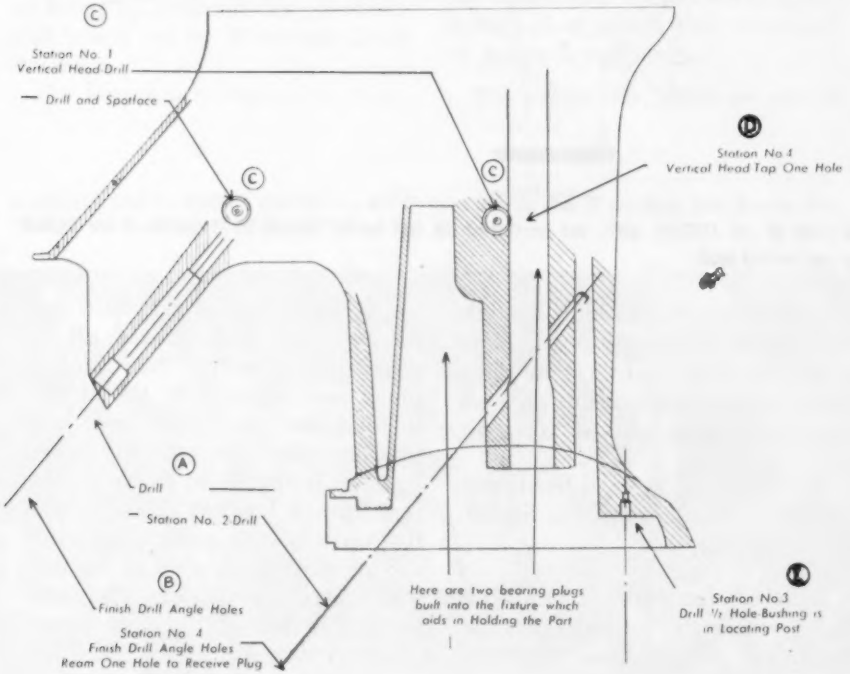
Station No. 2, horizontal head, drills 2 angle holes. This is an interesting operation and can be better explained in conjunction with Station No. 4.

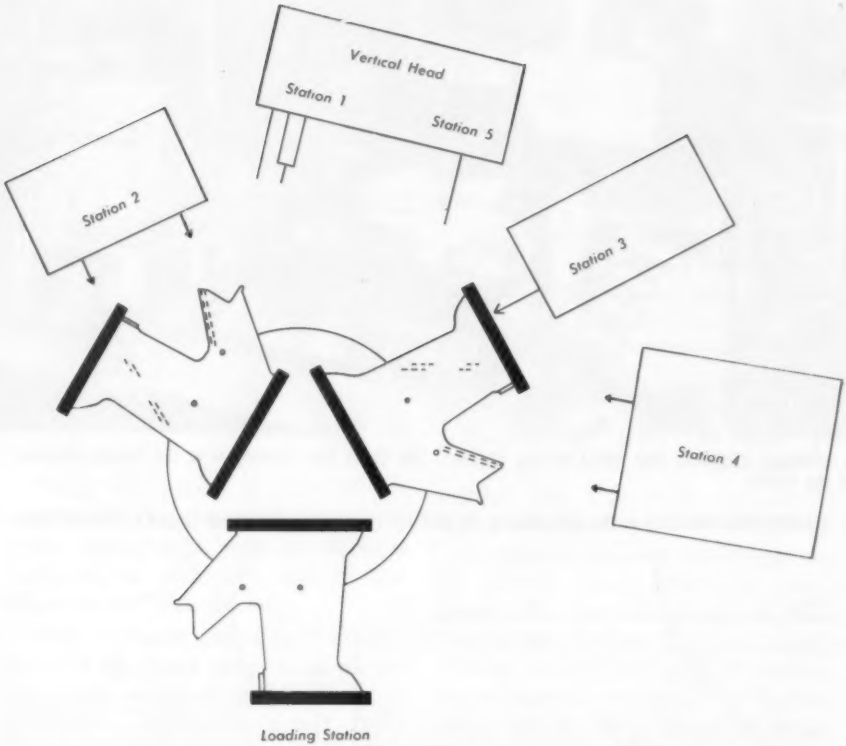
Station No. 3, drills a half a hole; the bushing for this is in the locating post of the fixture;



1. JOHNSON DESIGNED AND BUILT drilling machine. The Upper Gear Housing is in the loading position of the fixture.

2. A SIMPLIFIED DRAWING of the part showing the position of the holes drilled and tapped by the machine.



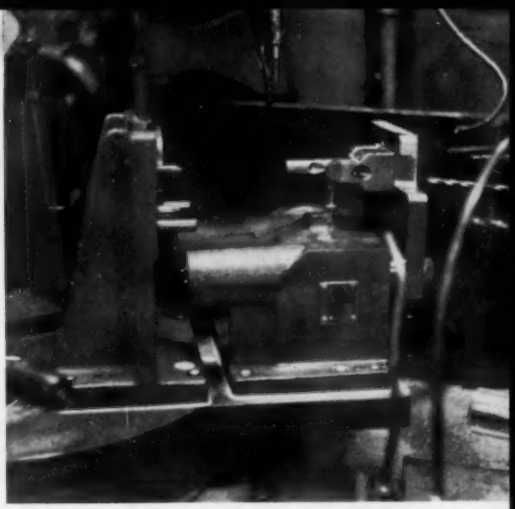


3. VIEW OF THE FIXTURE, parts, and location of the drill heads. Stations No. 1 and No. 5 are located in one vertical head.

Station No. 4, finish drill angle holes made in Station No. 2. Also ream one hole and drill another. The reamer hole eventually receives a plug and must be very accurate.

Station No. 5, vertical head, performed at the same time as Station No. 4, tap one hole.

To return for a minute to Station No. 4 where the angled holes are finish drilled: note from the drawing, figure 2, that the drill must drill through two walls inside of the piece part. However, two locating plugs are attached to the fixture to hold the piece part, and these locating plugs fit into the cored holes as indicated in figure 2. The problem of how to drill through the walls of the piece part while the locating plugs were in the way was solved simply and efficiently by drilling through the two locating plugs. A close-up view of the fix-



4. A FIXTURE WITHOUT THE PIECE PART, showing the locating plugs which hold the part in place. Note the holes through the plugs. A drill angles through the two plugs and through two walls of piece part. A corner of the back fixture plate has been cut away to enable the drills to angle in.

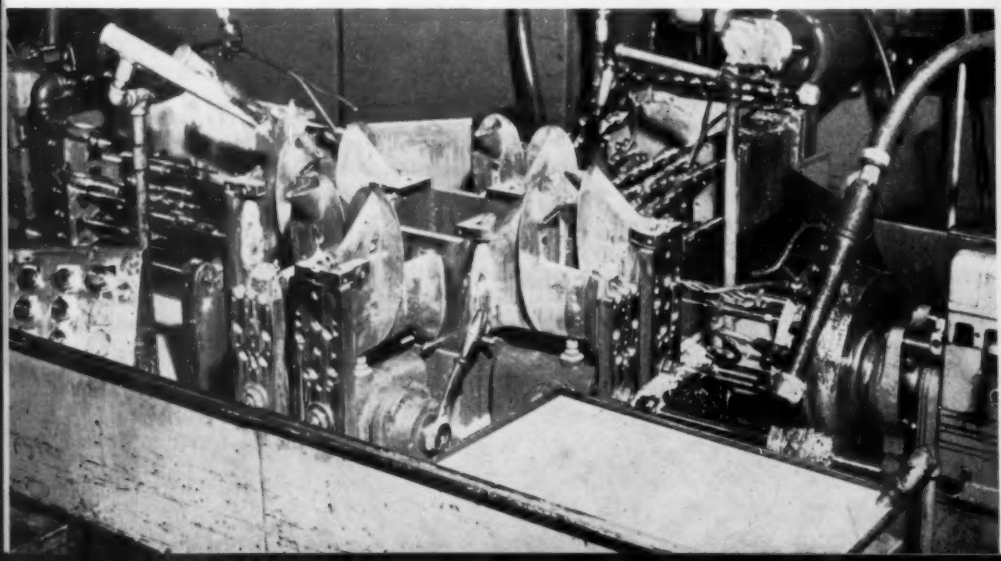
ture without the piece part and showing the locating plugs is shown in figure 4. The view was taken at station No. 4 and shows the drills, the plugs, the holes through the plugs (the holes, incidentally, serve as drill bushings) and the tap from the vertical tapping head of station No. 5.

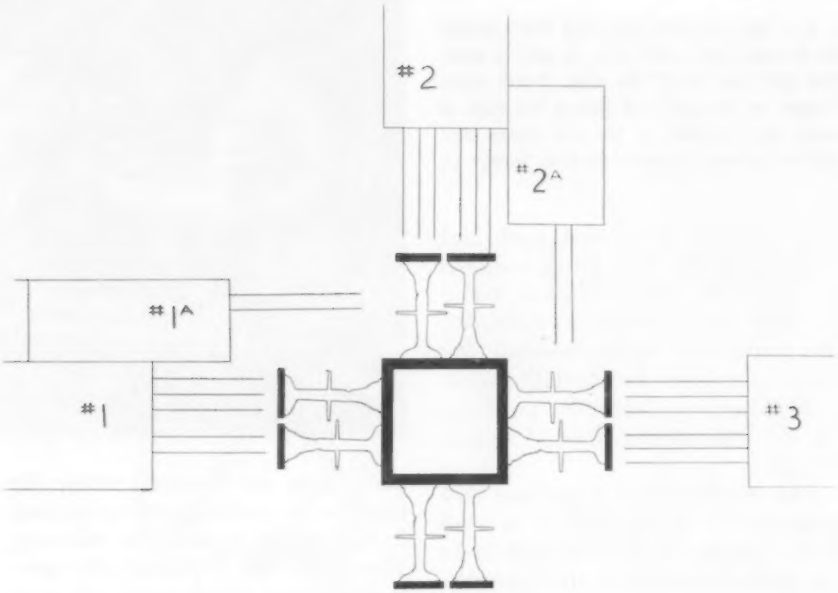
The vertical head is one unit and performs at station No. 1 as well as at station No. 2. The drill units are made by Drillunit, Inc., Detroit; drill heads are by Wisconsin Drill Head Co.

The fixture is composed of three parts; two are working while the third is for loading and unloading. A foot pedal is used for indexing. The entire unit is electrically interlocked, all of which work was done by Johnson engineers.

We asked Mr. Medeen about

5. ANOTHER SPECIAL JOHNSON MACHINE for drilling holes into the ends of the Upper Gear Housing. This operation follows the one described in figure 1.





6. A SKETCH OF THE PIECE PARTS in position in the fixtures. Note the three main drilling heads, two of which have satellites. (Location of drills is not accurate in this sketch.)

the cost of building these machines vs. buying specials from a manufacturer.

"Well," he said, "there's really nothing complicated about these machines. We merely bought the drill units and the heads and hooked the thing up. It was cheaper than buying a special. I don't mean to imply that special machinery builders wouldn't have done a good job, it's just that we now have greater flexibility, had them finished months sooner, and got them cheaper."

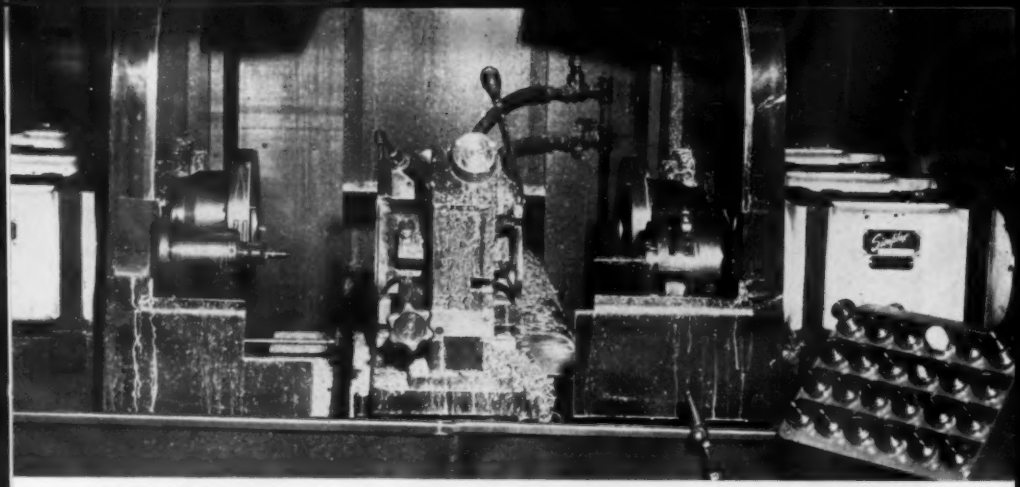
"How much, roughly, did this unit cost you, and how long do you think will be required to amortize it?"

"The approximate cost, including tooling, and all the rest, was about $15,575 and we plan to amortize the cost over 8 months to a year; so you see, it's quite a saving."

The next operation on the same Upper Gear Housing is performed on another Johnson special machine.

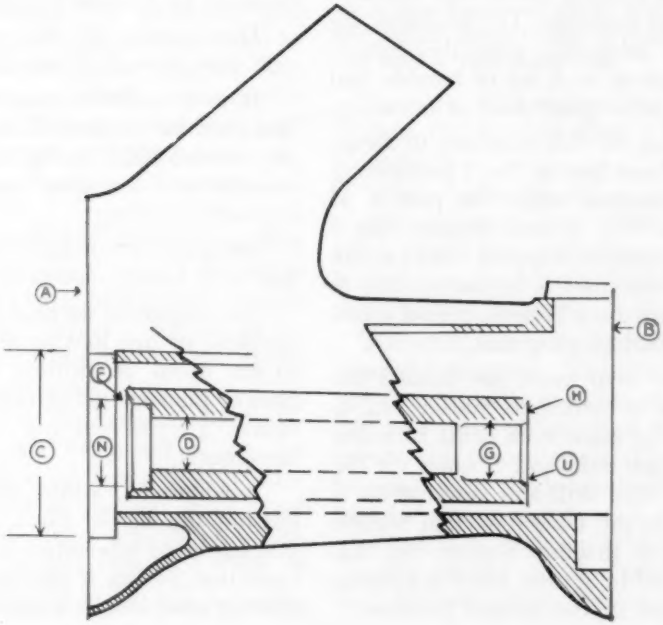
It is of the same order as the machine we just examined. The only difference being that here we have three horizontal drill units and a four-part fixture.

Two piece parts are loaded into



7. THE SIMPLEX MACHINE which bores and faces the Upper Gear Housings before they reach the drilling machines.

8. A SKETCH OF THE PIECE PART and the operations performed by the four heads of this machine. In this, as in other sketches, the piece part has been simplified to better portray the operations. Machined faces are shown in red.



continued

each fixture station; however, they are so placed that two different ends are drilled in each station. By examining the loading station in figure 6 note that one piece is having one end drilled while the piece next to it is having the other end drilled. When the cycle is completed the operator switches the two parts around and repeats the cycle. When the fixtures are finally unloaded eight piece parts will have been drilled.

"On this machine," Mr. Medeen commented, "as on all of these specials which we build, the fixture acts as holding device and also acts as drill bushings. The bushings are made integrally with the fixture. This saves us a lot of trouble and gives us a great deal of accuracy.

"Also, on this machine in figure 5 we have Station No. 1 performing an operation while the part is at Station No. 2, and Station No. 2 performing a tapping operation while the part is in Station No. 3. Here we use a Wisconsin lead screw equipped tapping unit."

After two parts are loaded the fixture is turned to Station No. 1. Here the main head drills 15 holes; 7 on one side and 8 holes on the other. Also drill and counterbore 1 hole. At the same time that Station No. 1 is drilling, Station No. 1A, attached to Station No. 1 is tapping the part in the second position.

At station No. 2 drill 6 holes and 4 holes. Station No. 2A, attached to Station No. 2 taps 2 holes while the part is in the third position.

At station No. 3 drill and counterbore hole done in the first station, ream 2 dowel pin holes and drill 5 holes.

The holes vary in size from ½ in. to ⅛ in. The gearing in the drill heads compensates for the speeds of the various drills.

Again, units are Drillunits, heads are Wisconsin. All controls are electric and interlock. The electrical work is also designed and manufactured by Johnson people.

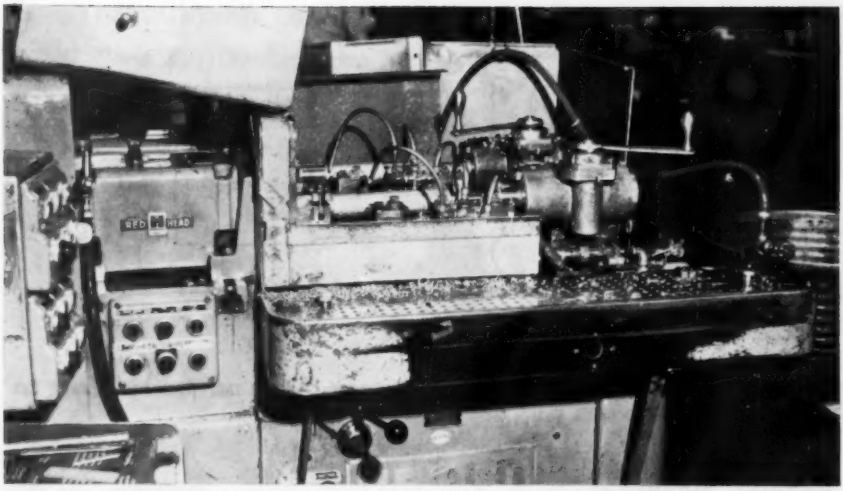
"How much did this particular unit cost to make?" we asked.

"It costs a little more than the first machine we looked at, I should say around $22,378. Again, we will amortize the cost over 8 months to a year."

"You use a lot of these drill units and drill heads," we said.

"Yes, whenever we have a drilling problem or are looking for a way to cut down on drilling costs we always plan on using multiple heads. They've cut our costs tremendously.

"Incidentally, while we're discussing the Upper Gear Housing, you might be interested in the first operation, before it gets to the first drilling machine. This machine was



9. THE HEALD BORING MACHINE used for turning operations. Two shafts are mounted in the chucks and turned simultaneously.

built by the Simplex people to our specifications. The electrical and hydraulic controls are made also to our specifications for this job. The rotary selector switch was made by Johnson and furnished to Simplex."

Figure 7 shows the machine with a piece part in place. This machine has four heads, right front and right rear and left front and left rear. The drawing, figure 8, shows the piece part as it would look locked in position. The sketch is rough and is designed to show merely the operational sequence.

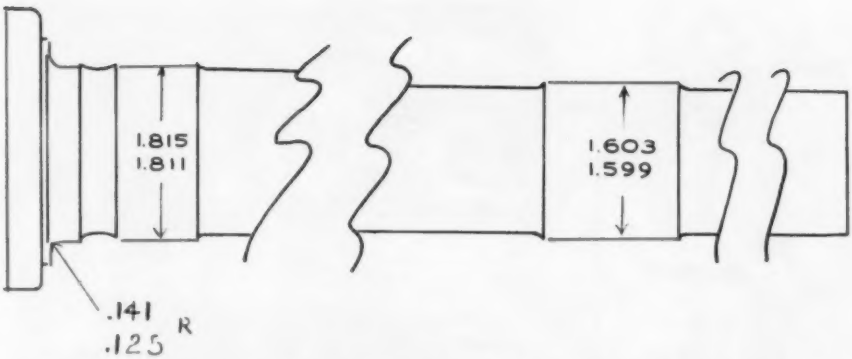
The right front head bores *G*, faces *H*, and chamfers *U;* on the right rear head faces *B* with a fly milling cutter; the left front head bores three holes at *C*, *N*, *D*, chamfers *F;* the left rear face mills *A*.

These rear heads are interesting in that two cutters are on each head, one slightly ahead of the other permitting a roughing cut and a finishing cut.

These are solid carbide bits about 5/16 in. dia. Cycling time is 1 min. 57 seconds.

"While we're down here, there's a job over here that's a bit different. It's a Heald boring machine which is used for a turning operation. We don't do any boring on it at all."

The unit, shown in figure 9, is a standard machine. The operations are shown by the red lines in figure 10. Two tool holders work on two pieces at the same time. Three diameters are turned, one radius and two facing operations, on two pieces. The pieces are held by two driving chucks on the small end and by two spring loaded chucks



10. SKETCH OF THE SHAFT. The turned and faced surfaces are shown in red. Again, the drawing has been greatly simplified.

Special Machines

continued

on the large end. The chucks are hand operated. Complete cycling time of the machine, for two pieces, is 1 min. and 39 seconds. Production is 49 per hour.

"On this particular job," Mr. Medeen said, "we use carbide tools, although we have a number of machines where we use diamond tools for turning operations. Diamonds are used because we get just the finish we need and eliminate grinding operations.

"However, to get back to the drilling machines once again, the ones we discussed earlier. We have a number of them which are quite complicated. On one of them we have drills crossing each other from different heads; they're so close together you couldn't get a piece of paper between them. We have heads come up from underneath the machine, and heads coming from the top, in fact, there are heads all over the machine. The beauty of these setups is that we can change design at a moment's notice. All in all, they've worked pretty well for us."

We thanked Mr. Medeen for his time and asked permission to come back and do a few more stories.

"Come back any time. We've got some pretty interesting things here still to show you." • • •

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Given this piping arrangement could you suggest a . . .

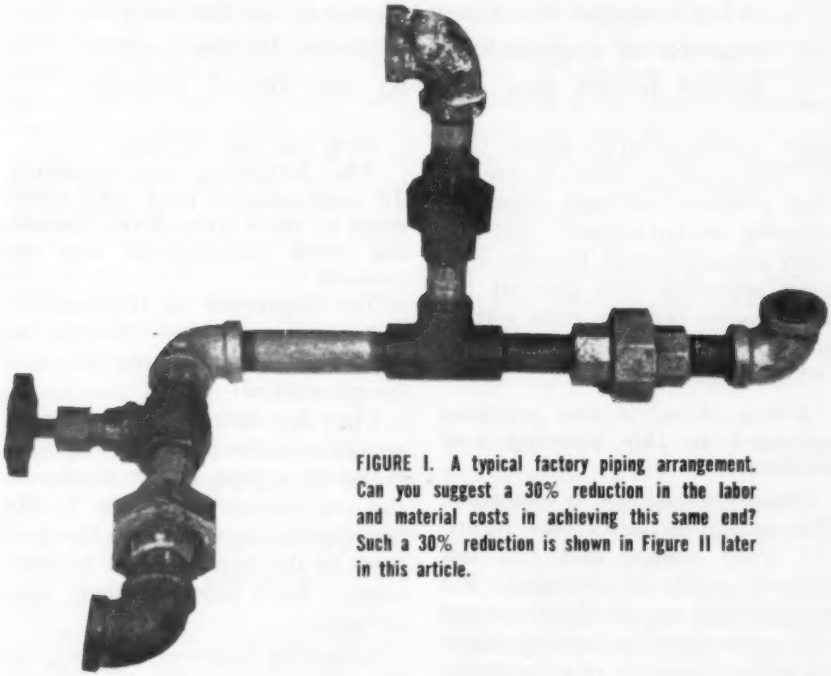


FIGURE I. A typical factory piping arrangement. Can you suggest a 30% reduction in the labor and material costs in achieving this same end? Such a 30% reduction is shown in Figure II later in this article.

30% Reduction in Labor and Material Costs?

By Harold R. Nissley
Professional Engineer

• Because of the nebular nature of plant maintenance, most firms have given up trying to control daily maintenance costs despite their heavy drain on factory burden. A few companies have tried to measure common maintenance items such as plumbing work (by measuring the time it takes to cut and thread various sizes of pipe, etc.).

Both the do-nothing and the measurement approach leave something to be desired. The measure-

continued

What's needed to cut maintenance costs? Certainly an engineering approach, consideration for the psychological factors plus planning and lots of patience

ment approach while better than the do-nothing attitude creates other problems without, generally, reducing maintenance costs; in many cases, however, this measurement approach does prevent the maintenance problem from getting further out of hand by setting up certain controls.

What, then, is the practical approach to this growing cost problem?

Broadly speaking it is education. This education takes two forms: (1) trade school; and (2) less formal on-the-job training. But trade schools are chiefly concerned with apprenticeship training—training in fundamentals of a particular craft or skill. Certainly, cost reduction is not emphasized in most of these schools.

If real progress is to be made in cost reduction among maintenance personnel, companies must take the initiative themselves.

One of the newer tools by which such costs can be drastically cut is work simplification.

Thus by eliminating all or part of a job and getting others to adopt these new methods enthusiastically, you get results that are both tangible and permanent.

How can this be done?

The following case involving 10 maintenance men who spent most of their time doing plumbing work illustrates one approach.

The supervisor of this maintenance crew obviously had to be "sold" first. Here was the plan and how it worked:

The day before a meeting of supervisors, the industrial engineer made up a pipe layout similar to the one shown in Figure 1. He brought this to work with him and went to the Supervisor of Maintenance. Let's listen to their conversation:

Industrial Engineer (holding up pipe arrangement shown in Figure 1): "George, do you have much of this kind of piping layout around the factory?"

George: "Heck, yes—and much of it more complicated than that."

I.E.: "Is there any way the cost of this could be reduced?"

George: "If you're talking about pipe fittings, you'd better ask the purchasing agent; he gets those fittings for the lowest possible cost, I imagine."

I.E.: "I'm not thinking solely about any one cost. Suppose we

consider everything—fittings, labor, maintenance, etc."

George: "Well, if you cut out some of those unions, you could save money; but that ain't good when you want to break into the line again at some later date; so I would leave them there. No, there is no way you could save anything on that unless you changed the dimensions or the layout; and before I could suggest any ideas along those lines I would want to know more about the system this pipe arrangement was fitting into."

I.E. (Pointing to the top middle elbow—see Figure 1): "George, if you substituted a Street L for this regular L and then moved this union up to engage the Street L, would that work?"

George: "Yep, that would work."

I.E.: "Would that eliminate a nipple?"

George: "Yes, that would do away with this top nipple. But you would have to make this other nipple a little longer in order to maintain your dimensions."

I.E.: "Can you think of any other ways you can save time and materials on a layout like this?"

George (Pointing to the right Elbow): "Well, I suppose you could do the same here: Substitute a Street L for this and move the union over to engage it thus eliminating the nipple."

I.E.: "That sounds reasonable. Are there any other ways we can cut down on the amount of time and material in this piping arrangement?"

George (Pointing to the Elbow in the left foreground of Figure 1): "You could do the same here, too."

I.E.: "That's fine. Now we have eliminated three nipples with consequent savings in labor as well as material. Are there any other ways this piping arrangement can be improved?"

George: "No, that's all—unless you eliminated some of the unions; and that gets you into trouble later when you want to break into a line."

I.E. (Pointing to the valve): "George, would this work—if you substituted a right angled valve for this straight valve?"

George: "Yes, that will work."

I.E.: "How many fittings will you save if you do that?"

George: "Well, you will eliminate another nipple and this L." (Pointing to the upper left hand elbow.)

I.E.: "That's fine. How many fittings have we eliminated up to date?"

George: "Well, the first three and these two—that makes five."

I.E.: "Will your new pipe layout be as good as this one I made up in my home workshop?"

George: "Sure it will—and it will save time and fittings."

I.E.: "I believe you are right. How would you like to make up a sample layout along the lines we have just discussed and bring it to the supervisor's meeting tonight?

I'll show the fellows this arrangement of mine (Figure 1); then after they have stopped guessing on how to improve it, you bring out the arrangement you made up (Figure 2). I think we can have some fun. How about it?"

George: "Sure, I'm game. But you leave this arrangement of yours with me so that I can maintain the dimensions."

That evening before 32 other supervisors the industrial engineer showed and presented the conventional pipe arrangement and asked for suggestions for improvement. After several false starts, the group eliminated the three nipples indicated above. No one suggested the right angled valve with a consequent saving in two fittings (a nipple and an L). When the discussion had run out, the industrial engineer turned to George and said: "George, show them your pipe arrangement." Proudly, George brought forth this arrangement and held it before the group.

I.E.: "This is an arrangement that George made up today for this

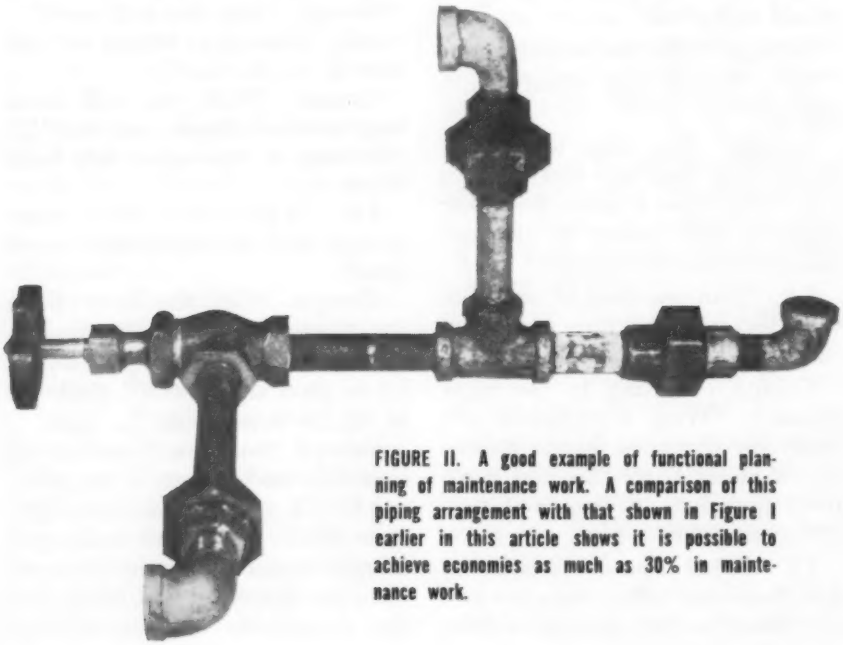


FIGURE II. A good example of functional planning of maintenance work. A comparison of this piping arrangement with that shown in Figure I earlier in this article shows it is possible to achieve economies as much as 30% in maintenance work.

meeting. George, how many fittings are there in this arrangement of mine which seems to be a common piping arrangement all over the county?"

George (Counting them one by one before the group): "Seventeen."

I.E.: (Laying aside the conventional layout and picking up the one George made up): "How many fittings are there in this one of yours?"

George (Counting again): "Twelve."

I.E.: "What percentage reduction is that in both labor and fittings?"

George: "Well, a reduction of five fittings as you go from 17 to 12."

I.E.: "That's close to 30 per cent. Would you say then that it takes about 30 per cent less labor on this new arrangement compared with this conventional layout?"

George: "Yes, I would say so."

I.E.: "Would there be a 30 per cent savings in the cost of fittings, too?"

George: "Not quite because street L's cost a little more than ordinary L's; and right angled valves cost more than straight valves. I can't recall just how much more these fittings are—perhaps 10 per cent more expensive."

I.E.: "So the savings in fittings would be somewhat less than 30 per cent."

George: "That's right."

I.E. (Turning to the audience): "Can anyone think of any other possible savings from this new pipe layout?"

(Silence)

I.E. (Turning to George): "Would it be fair to assume a 30 per cent reduction in the number of fittings would result in a 30 per cent saving in future repairs because there are fewer joints?"

George: "That's right."

I.E.: "George, with your help all of us have discovered it is possible to cut down on labor and material in maintenance work. It will be a credit to all of us if we can continue to make 30 per cent savings in plumbing and other maintenance work. I am sure George's men will share his pride when the maintenance costs drop the next year."

Thus ends our little play—based on an actual situation (names and places, of course, disguised).

It is not necessary to point out the engineering and psychological factors that were brought to bear on this important cost problem.

Needless to say, however, that this cost reduction seed within the maintenance department of this company could have become sterile at a dozen points in this approach—if (a) a down-to-earth example had not been selected; and (b) if the industrial engineer had made himself the "hero" of the "play."

Sure, this is a long way around Robin's barn. But this long way will produce surer and more lasting results than the "quicky" or expert approach so common today.

ACTUAL PROCESS OF METALLIZING is shown here. Other crankshafts in foreground await their turn.

At American Motors, 50 crankshafts per day are

Salvaged By Metallizing

● The American Motors Corporation Plant at Kenosha, Wisconsin has been making effective use of their metallizing equipment for many years. However, it was in 1950 that they first began the salvage operation that has since saved them, by their own conservative estimate, well over a half a million dollars on one type of job alone. It is the story of American know-how, ingenuity and one in which a comparatively small company, Metallizing Engineering Co., Westbury, N.Y., helped a very large corporation to meet production deadlines and also make very appreciable savings. Here is the problem and final solution as outlined during a recent visit to this huge plant.

In the Crankshaft Assembly Section of American Motors there is a stockpile of apparently finished crankshafts. But not visible to the naked eye, these shafts are not perfect, and if placed in new automobiles would cause owner dissatisfaction, dealer unhappiness and company management headaches. As in any assembly line production setup, a certain percentage of these crankshafts, prior to 1950, when slightly but improperly ground, had to be scrapped at an obvious loss to the manufacturer.

Naturally all avenues of escape from this tremendous waste were thoroughly discussed and investigated. One absolute requirement was that any parts saved must be at least equal to or, if possible, better than the completed production line shafts as no compromise with quality could be considered—no matter what the savings might be. At this point American Motors engineers came up with the idea of using a scientifically proven metallizing system. Extensive tests showed very conclusively that sprayed crankshafts met and in fact surpassed all quality requirements. This was due primarily to the hardness and granular structure of the metal which provides an exceptionally fine bearing surface. How it has worked out for American Motors is now merely a matter of facts and figures.

continued

"To be able to salvage almost all of them that we used to throw away or scrap is a boon to our assembly line . . . a tremendous dollar saving."

They metallize 50 crankshafts a day, 5 days a week, 50 weeks a year.

All of these would have been scrapped had it not been for this installation of metallizing equipment. The actual dollars and cents saving per unit works out this way. Manufacturing cost of a crankshaft at this point is $16.00 while scrap value would be about $1.50. The metallizing and finishing costs about $4.00 or a net saving of slightly over $10.00 on each part.

FINISH GRINDING OPERATION (above) is followed by a careful check before installation on assembly line.

American Motors' savings since early 1950 has been well over $600,000 and the equipment is also used for other work of lesser importance.

They cut down-time delay, a considerable factor when meeting a production schedule common to all automobile plants. Robert Meyers, a Master Mechanic at American Motors was high in his praise of the equipment.

"It's been a real lifesaver for us," Mr. Meyers said. "Especially these last few months when we were all pushing to get the new Ramblers out and needed every crankshaft we could get. To be able to salvage almost all of them that we used to throw away or scrap, is a boon to our assembly line and a tremendous dollar saving to the company."

The actual metallizing work is simple and consists of four steps from start to finish. The area to be built up is merely mechanically cleaned with fresh emery cloth. Mechanical rather than chemical cleaning is specified as the latter tends to leave an invisible but objectionable film on the part. Portions adjacent to the work area are masked off with ordinary "Scotch" tape to prevent adherence of metal where it would have to be removed. The operator then applies Sprabond* with his metallizing gun. This is essentially pure Molybdenum in wire form.

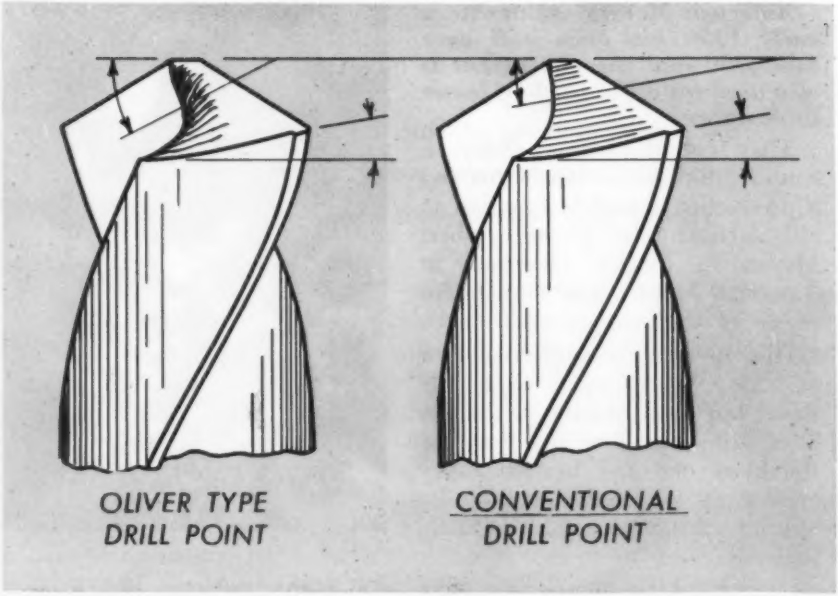
The finished thicknesses vary from .010" to .040" and are determined by the requirements of each particular shaft. The final step is finish grinding at which time it will be installed in a waiting Rambler.

LAST OF SEVERAL EXAMINATIONS is given crankshaft stockpile before joining the production line.

While the crankshaft job is the most spectacular there are many other uses for their metallizing guns at "American." Space limitations allow only a few of these to be mentioned here. They also salvage in "better than new" condition rear axle drive pinions, differential housings, differential cases and camshafts. Much maintenance work is done on plant machinery with a reduction in down time of anywhere from 2 days to 2 months.

• • •

* Trade name for product of Metallizing Eng. Co.



How to get

More and Better Holes

from your twist drills

The angle of the point, the cutting lip and its clearance must be kept right at every grinding to secure top results

IN TWO PARTS—PART 1

By Burton R. Leathley
Oliver Instrument Co.

● The success or failure of a twist drill is measured by the ability of the tool to penetrate the material being drilled as rapidly as possible and at the same time satisfactorily withstand the ensuing breakdown at the point for as long a period as possible. Since the bulk of all difficulties encountered in drilling are caused by faulty grinding of the point the importance of twist drill sharpening cannot be over-emphasized.

Basically, a good drill point consists of proper geometry together with correct clearances and concentricity. For this particular story we

continued

will not go into the matter of the various included point angles or clearance angles required for the many materials which are encountered in every day drilling operations. Most of the better commercial drill pointing machines which are available have provisions for varying the point angles and clearances. There are, however, many refinements which must be considered *regardless* of the included point angle or material being drilled.

Let us first consider the matter of lip clearance. The two locations where proper clearance is all important is in the area near the leading edge of the cutting lip and at the chisel edge.

Generally, when viewing the drill point from the side to determine whether or not a proper lip relief angle has been secured, the user is confronted with an optical illusion. In many instances the line formed at the juncture of the land and the relief angle will actually seem to turn upwards at the trailing edge. This all too frequently gives the user considerable concern over the problem.

The remedy employed by drill users far too often in this situation is to either increase the degree of clearance or add some type of secondary clearance. The use of more clearance to produce a satisfactory looking trailing edge in most instances will result in too much clearance at the vital leading edge.

The real source of worry is usually found in the section near the leading edge of the cutting lip as previously indicated. Our engineering department has had the opportunity of checking many drill points that are being produced in the tool rooms of industry. In all too many of the cases, when the drill point has been indicated, we have found little or no clearance and even reverse clearance at varying locations behind the leading edge of the cutting lip. There is of course a definite relationship between the rate of feed and the lip relief required. In the situations just mentioned insufficient clearance, too heavy a feed or a combination of both will set up an interference which will result in the poorest of drilling conditions and at the same time will cause damage to the drill prematurely.

A necessary evil on any drill point is the chisel edge.

In theory this portion of the drill does not function as efficiently as the cutting lips. Therefore, some attempt must be made to make this central portion of the drill point more effective as a cutting agent. If no attention was given to this central portion of the point the result would be highly disastrous and

could be compared with an attempt to push a broom handle through a cement floor.

The cutting ability of the chisel edge is controlled by three different dimensions. They are the thickness of the web at the point, the chisel edge angle and the relief or clearance angle on the chisel edge. The matter of the front web will be discussed in succeeding paragraphs.

The chisel edge angle on drills can be varied at will. Common practice places this dimension at from 105° to 135°. Obviously, the smaller angle would reduce the length of the chisel edge. As an example, by changing the chisel edge angle from 135° to 110°, the length of the chisel edge is reduced 25.75%.

A chisel edge angle of approximately 110° will afford the user of twist drills a two-fold advantage.

First, more of the cutting action is transferred to the positive acting cutting lips. This, in turn, reduces the work load normally assigned to the chisel edge. Secondly, the usually all important matter of hole size receives favorable treatment.

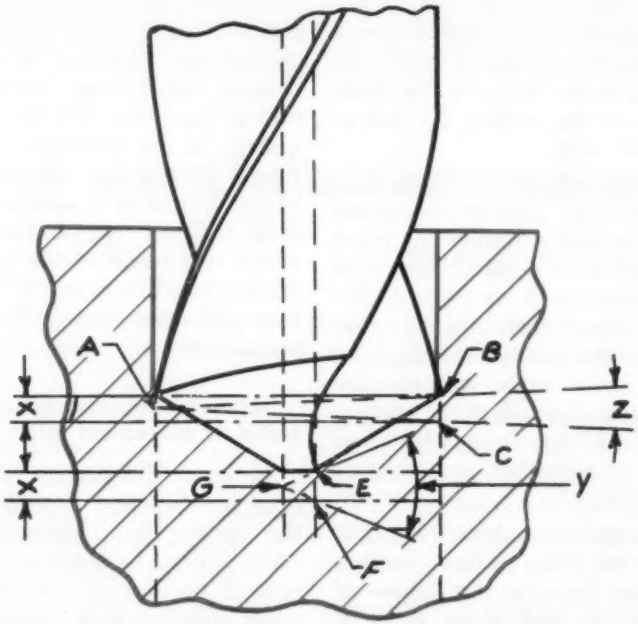


FIG. 2—LIP RELIEF ANGLE must be different at every point along the cutting edge

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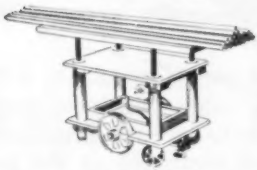

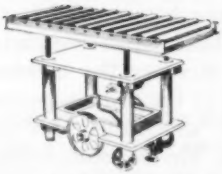

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Circle No. 282 on Card, Opposite Page 65

continued

Experience has shown that a reduction in the chisel edge angle will permit closer tolerances on drilled hole size.

A further development which has succeeded in making the chisel edge a highly practical cutting agent has been the introduction, by the Oliver Instrument Company, of a drill pointer that produces increased amounts of clearance toward the center of the drill. You will note in the illustration (see figure No. 1) a comparison between the normal point and the Oliver type point.

For a drill to be theoretically perfect it is absolutely necessary that the clearance or lip relief angle be increased as the center of the drill is approached.

The reason that the lip relief angle must be different at every point along the cutting edge is illustrated diagramatically in Fig. 2.

The rate of feed, or spindle and drill advance per revolution, is constant and is shown in exaggerated form by the distance X, indicated by a series of broken parallel lines. The helical path traversed by a point B on the periphery of the drill in one revolution is indicated by the projection BAC. The helical path traversed by a point E near the center is indicated by the projection EGF.

Since distance X, or the pitch of these two helical paths, is the same in both cases, angle Y of the smaller diameter helix EGF is greater than angle Z of the larger diameter helix BAC. The minimum theoretical clearance necessary for the drill to penetrate is one-half the angle of the helices; therefore, the clearance or lip relief angle must increase from the periphery to the center of the drill. This essential variation in lip relief angle is one of the principal objections to hand grinding.

The lip relief angle commonly found at the periphery of the drill is generally greater than necessary.

This, of course, results in a thin projecting edge which is readily susceptible to an early breakdown. A reduced clearance at the periphery is much more satisfactory as long as the necessary provision is made to increase the clearance as the center of the drill is approached. Figure 1 illustrates this feature quite well. This increased clearance at the chisel edge combined with a 110° chisel angle and proper lip clearance at the leading edge gives the drill user the fundamental requirements for easier penetration and longer drill life when coupled with proper front web thickness.

The experimental laboratory of one of our American universities ran a test to enable them to make a comparison between the ordinary

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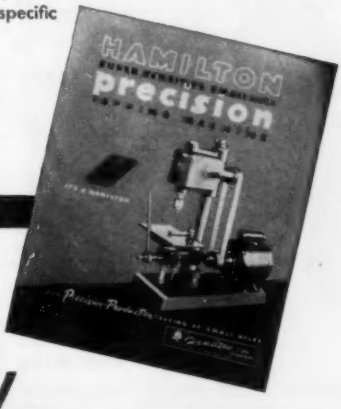

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ually all important matter of hole point and the Oliver type point. The comparison was made by measuring both torque and thrust.

The chart shown in figure No. 3 is typical and was based on using a 1" diameter drill in cold rolled steel. A similar test was run with 1" diameter drills in cast iron with almost identical results obtained. The ordinary type points in this test consisted of 118° included point angles, 7° clearance or lip relief and a 135° chisel edge angle. The Oliver points were 118° at the included angle and had chisel angles of 110°. The lip relief angle was varied as the center of the drill was approached in accordance with the previous recommendations.

The average reduction in torque afforded by use of the Oliver type point was 22.0%; the average reduction in thrust was 25.2%. The drilling machine requires far less horsepower and is subjected to considerably less wear and tear. The twist drill is also freer cutting. This, of course, results in more holes drilled per grind and less down time on the machine. In the next installment the author will discuss the importance of keeping webs on center and the lands equally spaced. • • •

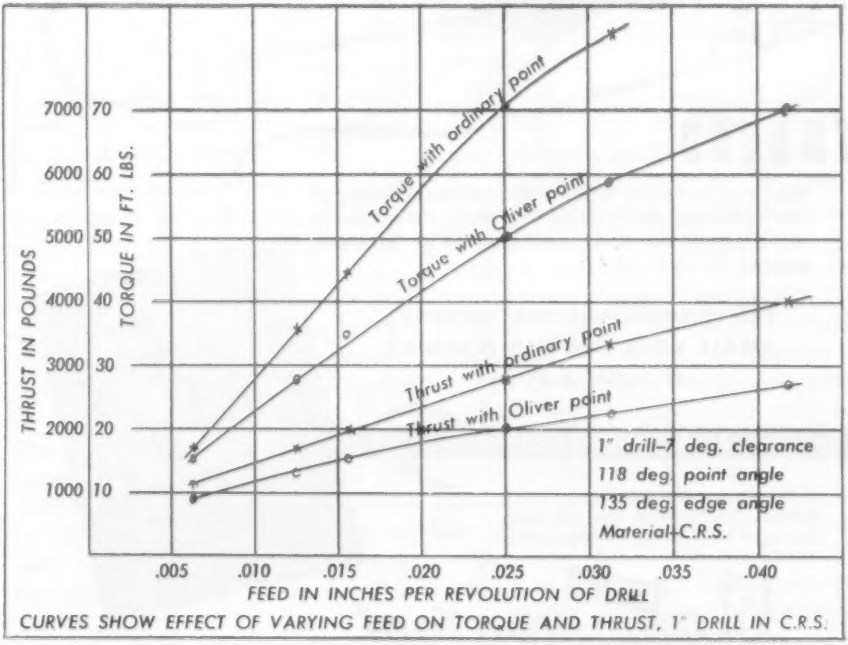
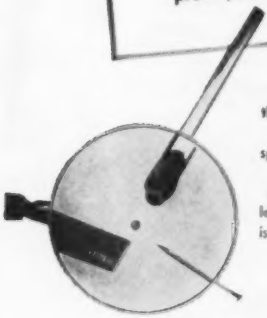


FIG. 3—Torque and thrust tests.

PRECISION GEARS

YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.

WANT FACTS?

Write for Bulletin No. 5419
Address The Hamilton Tool Company
826 South Ninth Street,
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IT'S A **Hamilton Tool**

USE IT WITH CONFIDENCE

Circle No. 284 on Card, Opposite Page 65

PROOF OF TAPMATIC PERFORMANCE

86% INCREASE IN PRODUCTION
WITH NO TAP BREAKAGE

HILL MACHINE COMPANY
1301 EDDY AVENUE
Rockford, Illinois

March 15, 1956

Tapmatic Corporation
845 West 16th Street
Costa Mesa, California

We believe you will be happy to learn of the excellent results we have had by using Tapmatic Tapping Attachments with our Hill Sensitive Radial Drill.

Our joint-armed drilling machine, with Tapmatic Tapping Attachments, has **reduced production time by 86%** in comparison with a conventional set-up on standard drill presses. In addition to reduced production time, by incorporating the Tapmatic Tapping Attachments, we were able to make a **substantial reduction in tool breakage,** especially with very small taps.

For our job **37,800 holes were tapped without breaking a tap.** Of this number, **12,240 were tapped No. 2-56, ½" deep.** The piece was a complex aluminum alloy aircraft part. A large number of the holes were bottom-drilled and tapped, the balance through holes.

We, therefore, consider the unusual performance of the Tapmatic Tapping Attachment to be a really radical step forward in producing sized, threaded holes with a minimum of effort and breakage and the maximum of efficiency and accuracy.

Yours truly,
HILL MACHINE COMPANY
Denzil J. Showers

Denzil J. Showers
Sales Manager
[illegible]

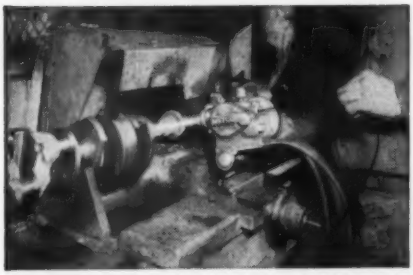
Send For Literature

TAPMATIC
CORPORATION

845 West 16th Street • Costa Mesa, California • Phone LIberty 8-3404

Circle No. 285 on Card, Opposite Page 65

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON
METALLIZING ENGINEERING CO., INC.
1147 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.
☐ Please have Metco Field Engineer call.

Name_____
Company_____
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City_____ Zone____ State_____

METCO

Metallizing Engineering Co., Inc.
1147 Prospect Ave., Westbury, L. I., New York · cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

Circle No. 286 on Card, Opposite Page 65

Contest Winners Honored

Third and fourth prize winners receive checks and plaques for excellence of entries in Blue Book's $2,500 50th Anniversary Production Contest

• Among the 198 entries in Blue Book's 50th Anniversary Production Contest that showed exceptional originality and sound machining practice were those contributed by James M. Cairney, engineer for the Hadco Engineering Co., Huntington Park, Calif. and the joint effort of A. L. Anderson and H. G. Pankratz, Bryant Chucking Grinder Co., Springfield, Vt.

Mr. Cairney was awarded the third prize of $300 for his article and sketches describing the use of automation in the production of commercial axles. Through this method, commercial axles for trailers can be turned out every two minutes—one third the normal production time. The complete production and handling of the axle from raw steel through milling, drilling and threading is now done by machine as developed at Hadco Engineering Company's plant in Huntington Park.

The fourth prize of $200 was awarded to contestants Anderson and Pankratz. These engineers worked together in submitting an article on loading ball bearings in a cage or retainer. This new method, involving a mechanical device, requires less than a minute. Formerly, it required 31 minutes to load the cage.

Judges in Blue Book's Production Contest were Ed. Fluskey, consulting engineer to Revere Camera Co.; Paul Prikos, Prikos & Becker Tool Co.; Ronnie Burritt, factory manager, J. J. Tourek Mfg. Co.; John V. Carlson, general superintendent, Union Special Machine Co.; and Eugene Zimney, assistant factory manager, J. J. Tourek Mfg. Co. • • •

PRESENTATION TO THIRD PRIZE WINNER: Left to right, James M. Cairney, Hadco Engineering Co., Huntington Park, Calif., prize winner; Harold Hauflaire, vice president, Hadco; Keith H. Evans, Hitchcock Publishing Co.; Paul R. Burt, chief engineer, Hadco.

PRESENTATION TO FOURTH PRIZE WINNERS: Left to right, Don Way, advertising manager, Bryant Chucking Grinder Co., Springfield, Vt.; Dan Reardon, Eastern Division manager, Hitchcock Publishing Co.; J. H. Beardsley, executive vice president, Bryant; H. G. Pankratz, co-winner; R. F. Hronek, Bryant works manager; G. E. Mellgard, director of personnel, Bryant; A. L. Anderson, co-winner; R. W. Stinson, chief process engineer, Bryant; Wm. F. Schleicher, vice president and editorial director, Hitchcock Publishing Co.

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Circle No. 287 on Card, Opposite Page 65

Can An Employer Refuse Holiday Pay To Employees Who Refuse to Cross a Picket Line?

What Happened:

The company had the usual holiday provision: an employee was paid for holidays provided he worked the day before and the day after the holiday. A day before Memorial Day, an outside union set up a picket line at the entrance. The company was open for business and most employees crossed the line without incident. Several did not cross the picket line to work, and were not paid for the

holiday. These employees filed a grievance on the grounds that they were being penalized for exercising the right not to cross a picket line.

The company put its decision on a simple basis—if an employee doesn't show up on a day before a holiday—no pay for the holiday. That's what its policy has been for years.

Was the Company:

RIGHT ☐ WRONG ☐

What Arbitrator Albert K. Whitton Ruled:

"The union's case rests primarily on the proposition that the refusal to pay these employees was a penalty exacted of them for their refusal to cross the picket lines. A penalty is a punishment imposed for the doing of some prohibited act, or for the failing to do a required act. It is this form of penalty or punishment which it is argued was present here. The claim is that these employees were deprived of their holiday pay. Yet it must be obvious that there can be no deprivation of that which a person has not acquired. Here the contract specified that to acquire a right to holiday pay, the employees must have worked on the regularly scheduled days immediately prior to and following the holiday. This they did not do. They are not entitled to holiday pay."

continued

Under What Conditions Can You Require Employees To Work Outside Their Regular Classifications?

What Happened:

It was Saturday morning and the plant was on skeleton crew, there being just a few men in the shipping department. A customer phoned and told the foreman that he was in a hurry for his order and was sending his truck over to get it. When the truck arrived, the supervisor assigned the men in the shipping department to do the loading.

"That's not our job," they complained.

"I know it," said the foreman, "but the regular loaders don't work on Saturdays and I've got to get this order out to our customer."

"Well, call in the loaders," suggested one of the workers.

"Then I'd have to pay them overtime because they've already put

in 40 hours," the foreman answered.

The employees did the work, but filed a grievance. At the hearing, the employer took a positive stand:

1. We have a right to assign workers to do any job as long as we pay them their regular rates and there are no hazards involved.
2. Overtime is not an employee right. The company is under no obligation to make overtime available if it has enough workers to do a job at straight time rates.
3. Besides, this was a temporary assignment for the shipping boys, and we've always had a policy of shifting employees on a temporary basis.

The workers' position was:

1. Management should not make unreasonable transfers just to avoid overtime payments.
2. This was no real emergency. A few telephone calls would have netted the regular truck loaders.

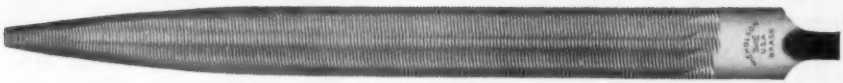
Was the Company:
RIGHT ☐ WRONG ☐

What Arbitrator Sanford H. Kadish Ruled:

"The employer is under no duty to assign overtime work. The work could have been performed by employees during their regular workday. Besides, the company's past practice of assigning employees to temporary jobs out of classification makes the grievants' position untenable. Grievance dismissed."

POP'S school of filing

POP TOL' TH' NEW GUY TO USE "SPECIALIST" FILES!
SO HE RIGS HISSELF OUT LIKE ONE A THEM HIGH-PRICED MEDICS!
POP'LL TEACH 'IM TO PRESCRIBE TH' RIGHT FILES FOR TH' JOB!



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NICHOLSON FILES
A FILE FOR EVERY PURPOSE

Circle No. 288 on Card, Opposite Page 65

continued

Can you establish safety rules without "talking it over" with the union?

What Happened:

One day, the production manager on a tour of the plant, contacted the foreman of a department and suggested he change 3 operations.

"They're unsafe," he said. "Somebody might get hurt doing it this way." The next morning the supervisor called over the employees on the particular jobs and told them of the change in the interests of safety. The workers balked. They maintained that the new way of handling the job would cut down on their earnings. Besides, they added, the manager is too cautious —there never had been an accident on these jobs. The foreman didn't buy these arguments and when the men kept working the old way, he gave them a warning notice. When they still persisted, they were given 2-day suspensions with a warning that one more violation would mean discharge. At this stage, the union entered the picture. It supported the employees and furthermore it maintained that management had no right to make changes without negotiating with the shop committee. It said that the new rules were really "change in working conditions" and management had no right to institute such changes on its own. The company countered that it had a right to "determine methods of production" and was under no obligation to bargain with the union on the establishment of safety rules.

Was The Company:
RIGHT ☐ WRONG ☐

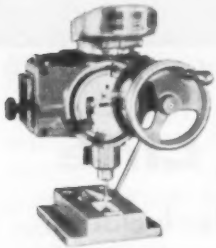
What Arbitrator Whitley P. McCoy Ruled:

"Men may differ as to the safest procedure. The company has reserved the right to enforce its bona fide decisions on such matters as that. The company was under no duty to bargain concerning the exercise of the rights expressly reserved to it in the contract. Each of the parties to the contract has certain rights which they can exercise without bargaining. For example, the union has a right to file a grievance without first bargaining with the company as to whether it should file such a grievance. Any dispute as to the reasonableness of the order should have been raised by a grievance complaining of the order, and processed in the orderly manner provided for in the contract. The men were properly disciplined."

Greater Versatility
is available with
Bridgeport MILLERS

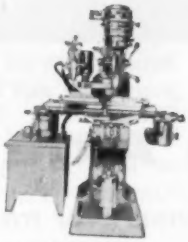
When you buy the BRIDGEPORT TURRET MILLING MACHINE, you buy more than a conventional machine of this type. You actually buy and get a machine in a type which has been conceived, created and developed by Bridgeport. In addition to the turret principle originated by Bridgeport, attachments have been designed which add a great many features to the machine so that its basic purpose for milling, drilling, boring and shaping has been extended to include also cherrying, right angle milling as well as copying with the Bridgeport Hydraulic True Trace Combination.

One of the outstanding advantages of this machine is that you can buy this basic machine with some or all of these attachments or add them later whenever the need arises for the handling of specific operations.



CHERRYING ATTACHMENT

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.



TRUE TRACE COMBINATION

The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and molds.

Investigation of Bridgeport Milling Machines and their many attachments is always in order.

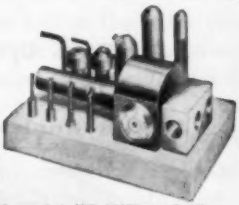
RIGHT ANGLE ATTACHMENTS

(Above). Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads.

(Above) Light duty . . . for right angle milling and drilling narrow, deep molds and cavities.

No. 2 BORING HEAD

Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



Bridgeport **MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Circle No. 289 on Card, Opposite Page 65

Horizontal Do-All saw and conveyor. Bundle of 35 pieces of axle stock is cut at a time.

Automated Axle Line

. . . spells operating economy for trailer builder

A 50th Anniversary

Contest Winner

By **James M. Cairney**

Hadco Engineering Co.
Huntington Park, California

• At Hadco Engineering Company, Huntington Park, California, special machines facilitate the manufacture of trailer axles. The production of both straight and drop configurations has been greatly improved by the design and usage of

continued

this machinery.

In the past the drop axle in particular was somewhat of a problem to manufacture with conventional tooling and to meet a competitive market both in price and quality.

As a comparative example let us follow step by step the processes required to manufacture a 2 inch square axle with a 4 inch drop and a 72 inch track, first through a conventional line of machinery and then through the production line of Hadco's specially designed machinery.

With conventional tooling:

Step No. 1: Cut stock to the required overall length. With power saw approximately 3 minutes.

Step No. 2: Heat about one-third of the axle to 2000° F. in furnace or oven—approximately 10 pieces—90 minutes or 9 minutes each.

Step No. 3: Drop forge the end with 4" drop and holding the required spindle length as close as possible. Time required approximately 4 minutes.

Steps No. 4 and No. 5 are to repeat Steps No. 2 and No. 3 on the opposite end. The time involved 13 minutes.

Step No. 6: Check spindle ends for alignment and drill lathe center holes at each end. Approximately 5 minutes.

Step No. 7: Set up axle in lathe between centers and support the 4 inch offset with steady rest. Approximately 10 minutes.

Step No. 8: Machine spindles at one end and thread extreme end of spindle. Approximately 25 minutes.

Steps No. 9 and No. 10 are to repeat Steps No. 7 and No. 8 on opposite end. The time involved 35 minutes.

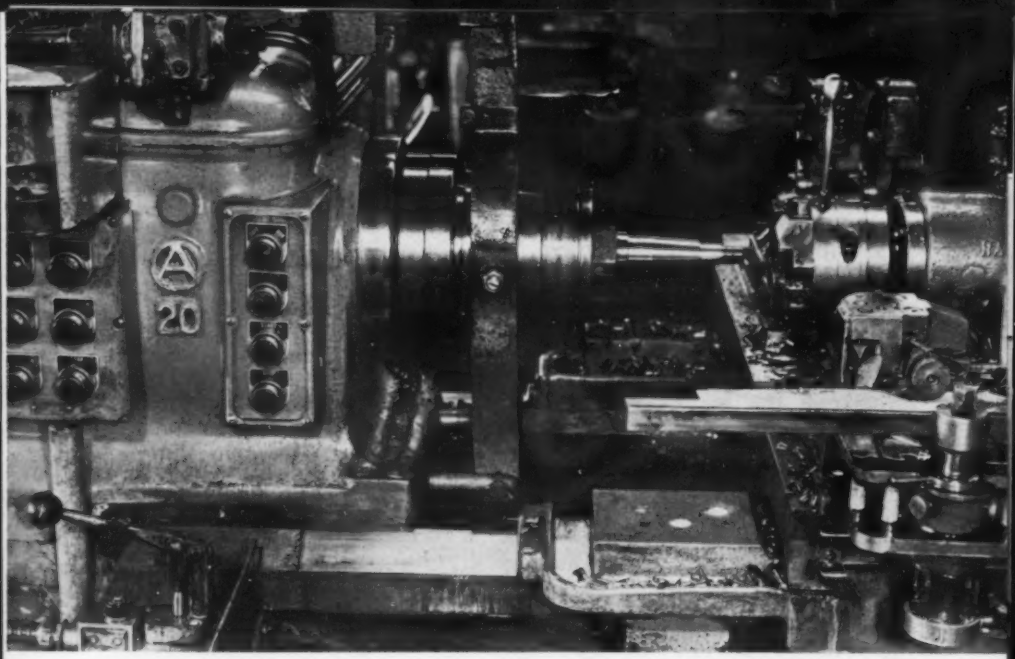
Step No. 11: Mill Keyway in each end for Key Washer. Approximately 5 minutes.

Step No. 12: Drill cotter pin hole through threaded section in both ends of spindles. Approximately 3 minutes.

We now have a 2 inch square, 72 inch track, 4 inch drop axle with concentric spindles that has taken us 112 minutes to manufacture using six machines to perform 12 operations. This method was originally used about ten years ago and the manufacturing techniques have been improved step by step until now we have the specialized tooling that will be described in the following paragraphs.

Let us now follow the same piece of 2 inch square raw stock through Hadco's production line to the finished axle.

Step No. 1: Cut stock to the required overall length. One bundle of 2" square stock containing 20 pieces is fed to a horizontal Do-All band saw by electrically driven rollers. The 20 pieces are cut to length at one time and in 30 minutes averaging 3.0 minutes per axle for the double cut.



Hadco axle lathe showing finished spindle in Hall collet chuck and carriage and cross-slide in central position.

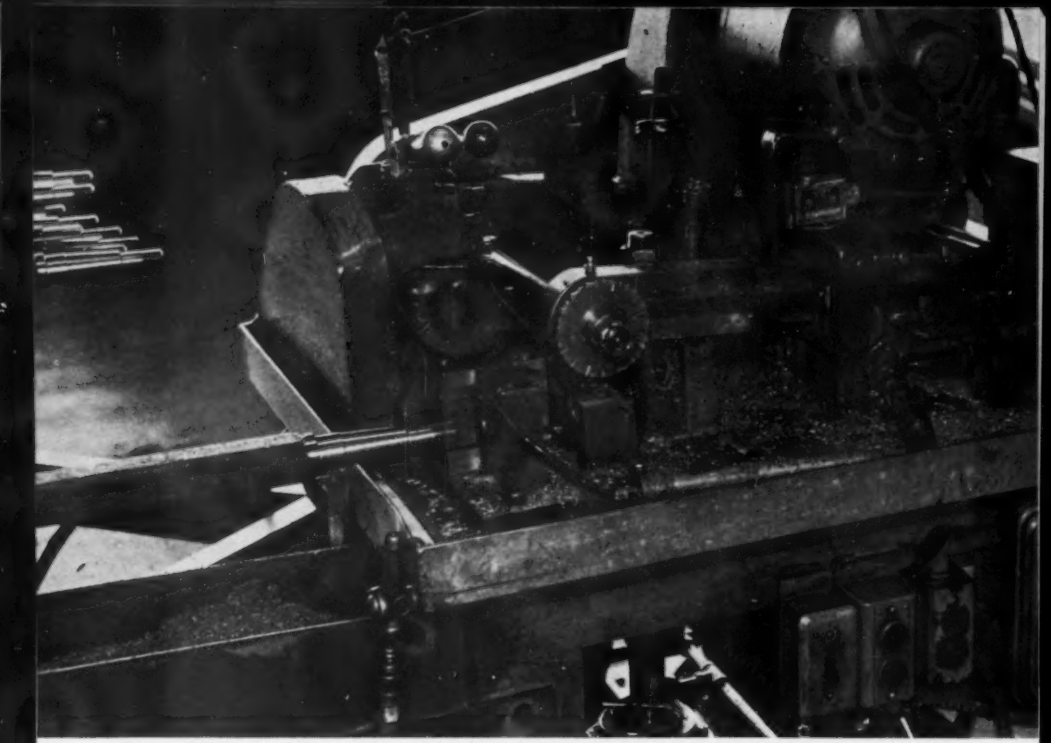
News of Automation

continued

Step No. 2: Set up axle in special axle lathe. The axle is fed through the hollow direct drive spindle and held in place by hydraulically operated Hall Collet Chucks. These were used because a regular collet chuck has a movement of approximately 1/64" and the hot rolled stock used varies up to .080 in size.

This operation takes 0.3 minutes.

Step No. 3: Machine spindle at one end. This operation is performed on a special lathe designed and built for the exclusive purpose of machining axles. The base is a standard 20" Axelson lathe with hollow spindle as mentioned in Operation No. 2 that will take stock sizes up to 2½" square. The cross slide is heavier than normal, is powered by a double acting hydraulic cylinder and has three mechanical positioning stops. Three tool arrangements are mounted on the cross slide. These tools can be changed over in from five to ten minutes to produce any one of five different sizes of spindles on ten different material sizes of square or round stock. When the operator pushes the start button, the first mechanical stop retracts allowing the cross slide to move forward to the first stage where it trips a micro switch which actuates a hydraulic



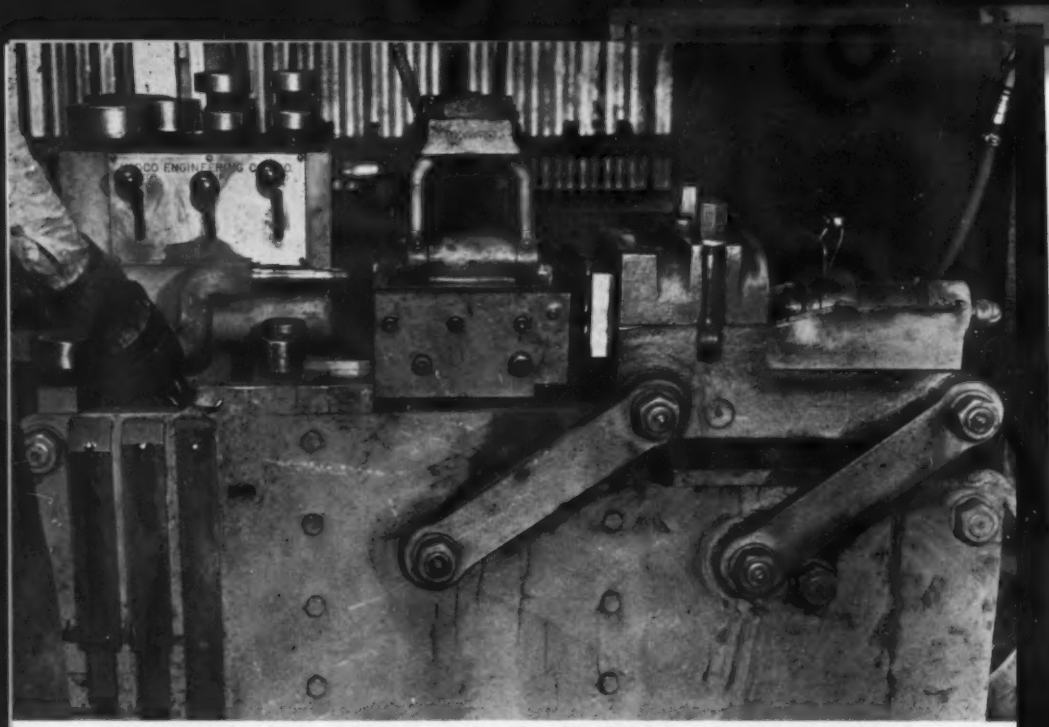
Hadco milling and drilling machine. Axle shown being removed after keyway has been cut and cotter pin hole drilled.

News of Automation

continued

solenoid and allows the lathe carriage to move in on the work. The carriage has rapid travel up to the work and by a cam and a Vickors hydraulic control valve slows the carriage to the correct cutting feed.

The roughing tool is Grade No. 370 Carbide and the contour of the spindle is traced by a finger integral with the tool by the use of a template and contour attachment built by the Campbell Contour Company. At the end of the cut, the tool retracts from the work and another micro switch and hydraulic solenoid arrangement backs the carriage off to the first position, actuates another hydraulic solenoid through a micro switch which moves the cross slide to the other extreme where the first micro switch solenoid combination allows the carriage to again move in on the work. This time the tools are roller turner box tools which finish the two bearing surfaces and the thread diameter to size within plus .000 minus .0015. These finishing tools are Grade No. 350 Carbide. At the end of this operation a switch automatically slows the lathe



Hadco axle bender showing a 2-in. square axle with a 4-in. drop being removed from machine. Axle bender head is returning to the start position.

News of Automation

continued

RPM's from the cutting speed to the threading speed and at the same time the second micro switch solenoid combination is again actuated to return the carriage to the first position and a fourth micro switch-solenoid combination moves the cross slide forward to the center stop at which time the operator moves a handle to engage a standard Landis die head which threads the spindle end and releases.

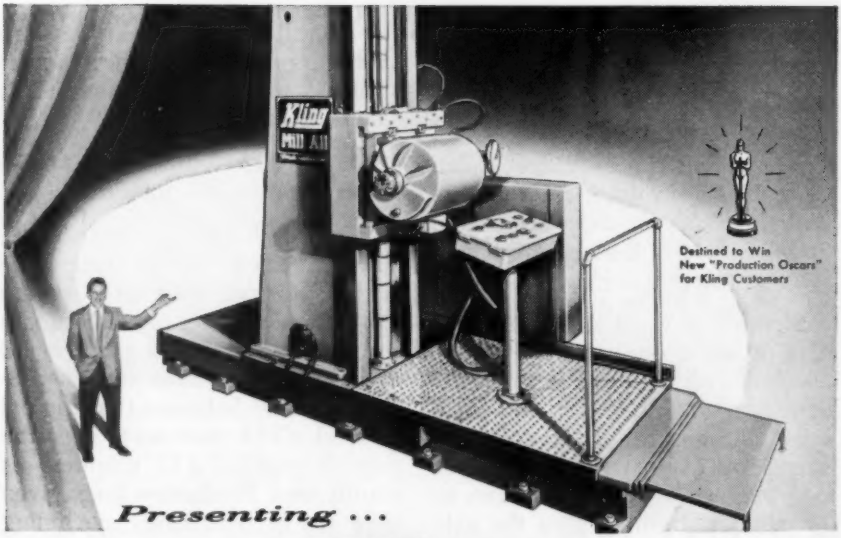
This operation takes 2.2 minutes.

Steps No. 4 and No. 5 are to repeat Steps No. 2 and No. 3 on the opposite end. The time involved 2.5 minutes.

Step No. 6: Mill the keyway for the Key Washer and drill the cotter key hole. This operation is performed on a combination milling and drilling machine. The work piece is clamped in a jig and a milling cutter mounted on a pneumatically actuated arm lowers on the work and cuts the Keyway. At the same time a horizontally mounted air drill is drilling the cotter pin hole. Both drill and cutter are fed to the work pneumatically and they each have their own electric motor drive. Time consumed 0.3 minutes.

Step No. 7: Repeat Step No. 6 on the opposite end. Time 0.3 minutes.

Step No. 8: Heat the axle to



the New Kling MILL-ALL

...does more facing jobs faster and at lower cost!

This new high speed face milling machine offers exceptional power and capacity, is simply designed, easy to operate and enduringly built, as demonstrated by these construction details: Primary construction, welded steel; Vertical feed screw protected by telescoping tubular brass covers; Non-metallic ways used on both horizontal and vertical ways; Telescoping steel covers used to protect horizontal ways; Motor mounted on slide which provides for 10 inches of in-and-out travel of cutter. Send for data.

2153MM

How this new machine Outperforms all others;

Some of its jobs	Feed Rates	Metal Removal Rate	Horiz. Cutter Travel	Vert. Cutter Travel	Motors	
Faces structural steel beams and columns and other steel sections and fabrications.	(Horiz. and Vert.)	Up to 60 cu. in. per min.	4 sizes	3 sizes	3 H.P. Horiz. and Vert. Gear Head Feed Motors with Brake	40 H.P. Spindle Motor Direct Drive
Faces steel and iron castings, forgings, weldments, die blocks, etc.			72" to 144"	60" to 84"		
Does plate edging; can chamfer plates and bars (tilting head model) and can be adapted to mill aluminum and other nonferrous metals.	40" and 80" per min.					75 H.P. also available

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Circle No. 291 on Card, Opposite Page 65

continued

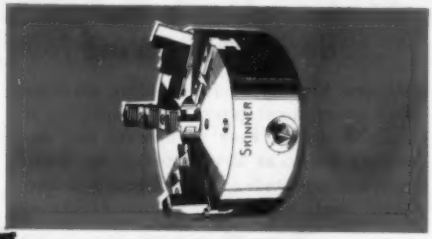
2000° F. with a Thermonic induction unit and special water cooled coils. Time involved 2.8 minutes. As the ends of two axles are heated at once, this is the required time for one axle.

Step No. 9: Bend axle to 4" drop. This is done on the Hadco Axle Bender. This machine is hydraulically operated and will bend fifty-seven different drops and configurations of axles with changeover time required from 0.5 minutes to 10 minutes. Both ends of the axle are held to a very close tolerance for overall length and inside drop and camber is set in the spindles from −1° to +1° as required. This takes 0.3 minutes.

Step No. 10: Repeat Step No. 9—Time required 0.3 minutes.

We now have a 2 inch square, 72 inch track, 4 inch drop axle with *cambered* spindles that has taken us 12 minutes to manufacture using 5 machines to perform 10 operations. The difference in production time between the original method (112 minutes) and the present method (12 minutes) is readily seen. Production times given here are in both cases machining cycle times only. • • •

for long-lasting accuracy and safety!



SKINNER
precision self-centering
SCROLL CHUCKS

Available in sizes from 3" to 18" for light, medium and heavy-duty toolroom jobs and production runs. Each is furnished with two sets of solid jaws, or 2-piece jaws for holding internal or external work. Bodies are forged or semi-steel; other parts are heat-treated alloy steel. Lands on the jaw, jaw steps and end bites are ground after the chuck is assembled.

THE CREST OF QUALITY

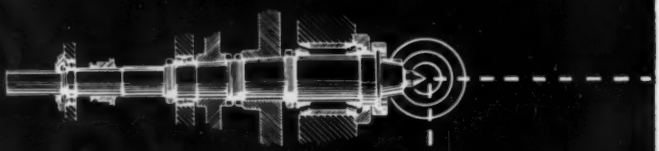
THE SKINNER CHUCK COMPANY

Write Skinner or your Skinner distributor for folder.

207 Edgewood Ave., New Britain, Conn.

Circle No. 290 on Card, Opposite Page 65

Cincinnati Sub-ZEROing in FOR ACCURACY



Shrink fit assembly assures maximum rigidity for spindle bearing raceways of new LeBlond 32 inch 4-bearing spindle.

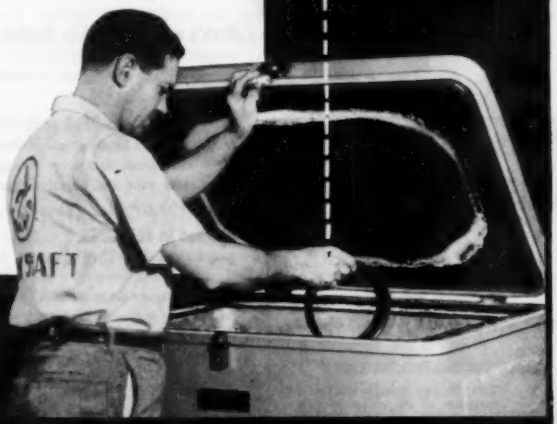
To assure maximum accuracy for every turning operation, The R. K. LeBlond Machine Tool Company utilizes a Cincinnati Sub-Zero Industrial Chilling Machine in shrink fit assembly of spindle bearing raceways.

This internationally known lathe manufacturer mounts the spindles of its 16", 20" and 32" heavy duty lathes in precision tapered roller bearings which run in close tolerance steel raceways. Shrink fit assembly assures that raceways will fit tightly in headstock, perfectly aligned for true spindle operation. In addition to raceways, many other vital components are chilled with Cincinnati Sub-Zero equipment at R. K. LeBlond, in stabilization as well as assembly operations.

A new catalog on the complete line of Cincinnati Sub-Zero equipment for industrial and laboratory use is now available. Write for your free copy or outline your special low temperature requirements.

at

LeBLOND of Cincinnati



Spindle bearing raceway is placed in Cincinnati Sub-Zero Chilling Unit R-70-10 at LeBlond.

Cincinnati Sub-Zero Products

GENERAL OFFICES AND PLANT: 3930-P6 READING RD., CINCINNATI 29, OHIO

Circle No. 292 on Card, Opposite Page 65

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PANTHER 5 TOOL BITS

FOR YOURSELF

Here's what you GET in Panther 5 . . . A high-carbon, high-vanadium, tungsten-bearing high speed steel with 5% cobalt. Its analysis is designed to give this grade the highest red-hardness and abrasion-resistance of *any* high speed steel.

Here's how it can HELP you . . . This combination of highly valuable properties gives Panther 5 exceptional ability to resist wear, yet it also possesses good toughness and edge strength. Put Panther 5 Tool Bits on your heavy-duty jobs and abrasive materials—*watch them step up your production runs between grinds!*

Stocked in ALL SIZES . . . Panther 5 Tool Bits are produced as a finish-ground product. They're carried in stock for immediate shipment in nine sizes of squares, from ¼" x 2½" long to 1" x 7" long . . . and in eighteen sizes of flats, ranging from ⅛" x ¼" x 3" long to 1½" x ½" x 7" long. ● *Why not get in a trial order—see for yourself what they'll do!* Check your nearest AL representative or distributor . . . or write *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

Valuable Data for
PRODUCTION MEN
. . . yours for the asking

1. **"HIGH SPEED TOOL BITS"**
Handy data on the complete AL line, comprising eight different grades of high speed steel tool bits. Includes shop handling, heat treat methods, etc.

2. **"CUTTING TOOL MATERIALS"**
This 36-page booklet analyzes and compares all AL grades of cutting tools: carbon and high speed steel, cast alloy and carbides. Includes data on handling and treatment.

ADDRESS DEPT. MB-79.

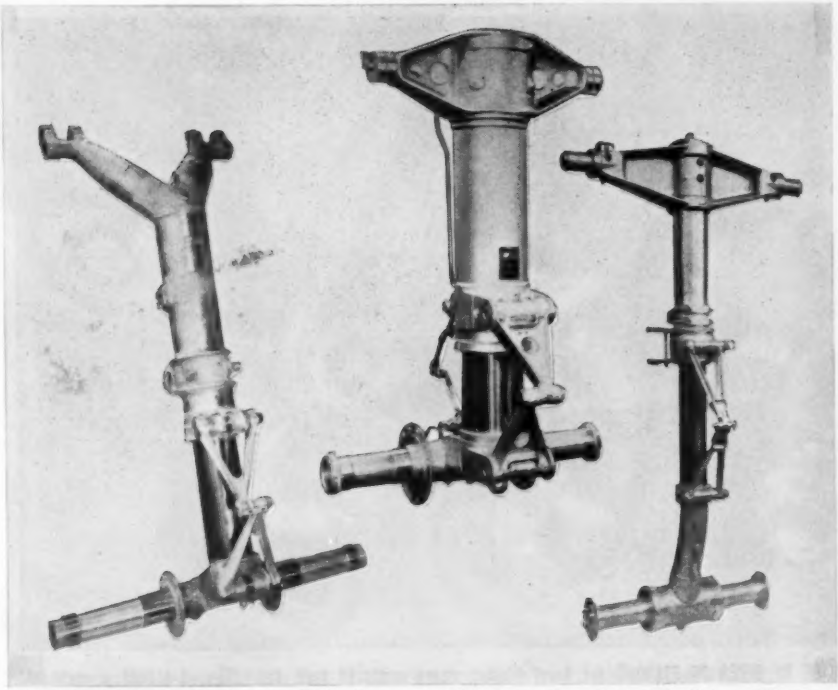
For complete **MODERN** Tooling, call

Allegheny Ludlum

WAD-5984

AL FINE TOOL STEELS SINCE 1854

Circle No. 293 on Card, Opposite Page 65



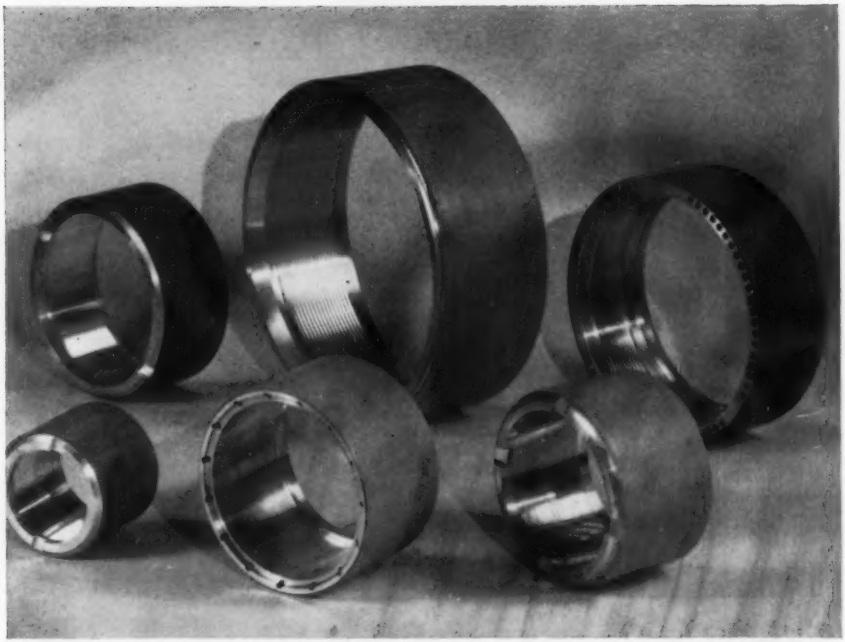
SHOCK-ABSORBING UNITS for aircraft landing gear, which use action of air and oil to cushion heavy landing impact. Douglas C-124 main gear (left); Boeing B-50 main gear (center); and Douglas C-124 nose gear (right).

Plastic-Clad Metal

Aluminum-laminate combination permits light-weight design on heavy duty hydraulic pistons

- √ Has high strength to weight ratio
- √ Resistance to action of hydraulic fluid
- √ Ability to prevent seizing of piston; resist scoring

● Weight reduction in piston-actuated hydraulic equipment is a problem bothering designers of many types of equipment. Hydraulic pistons, particularly for heavy-duty application, are usually heavy pieces of equipment. A new type



RANGE OF SIZES OF PISTONS for Aerol landing gears produced from laminate-clad aluminum material. Smallest (left foreground) is for 3-inch piston in landing gear of fighter plane. Largest (center) is for 10-inch piston in landing gear of largest commercial transports.

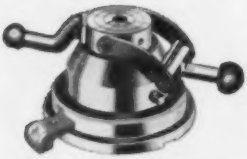
of piston, consisting of a covering of thermosetting phenolic laminate bonded to a base of 24ST4 aluminum, points the way to hydraulic pistons suitable for heavy-duty service that are also light in weight.

The piston design was developed by the Cleveland Pneumatic Tool Company for its Aerol type shock-absorbing strut used in the landing gears of commercial and military planes. The plastic-clad metal material required to make the design practical was developed for Cleveland Pneumatic Tool by the Synthane Corporation of Oaks, Pa.

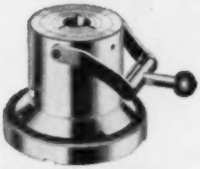
In the shock-absorbing units for aircraft landing gear, the pistons regulate the use of air and oil to cushion the impact of a plane's initial contact with the ground. The principle of the shock strut is quite simple. As the landing gear contacts the ground, the upward thrust on the wheels causes the section containing the piston to telescope, forcing oil through a small orifice and compressing the air in a chamber above. This utilization of oil and compressed air dissipates the kinetic energy generated at each landing.

Zagar Tools

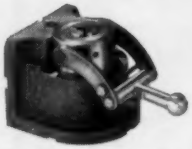
HOLD YOUR WORK—AND YOUR BUSINESS!



Collet indexing fixture



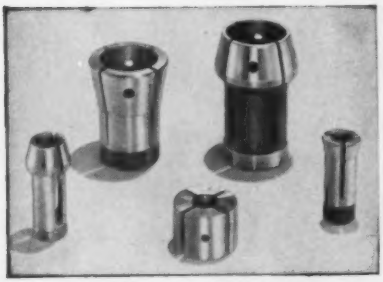
Collet holding fixture



Vertical-horizontal collet fixture

ZAGAR HOLDING and INDEXING FIXTURES

Zagar fixtures offer you a most inexpensive way to machine small parts. Set-up is speeded and much special tooling eliminated. Slot milling, straddle milling, drilling, tapping and grinding of small pieces can be done most profitably with Zagar fixtures, ***readily available from stock.***



COLLETS, PADS, BLANKS

Five types: No. 310 Zagar Master; Nos. 2 and 6 W. & S.; No. 5-C; No. 6 W. & S. pads. All but Zagar No. 310 are standard machine tool sizes. All collets are made of oil-hardened tool steel; have flat tops for locating purposes.

Write for Engineering Sheets "B-7" on each product.

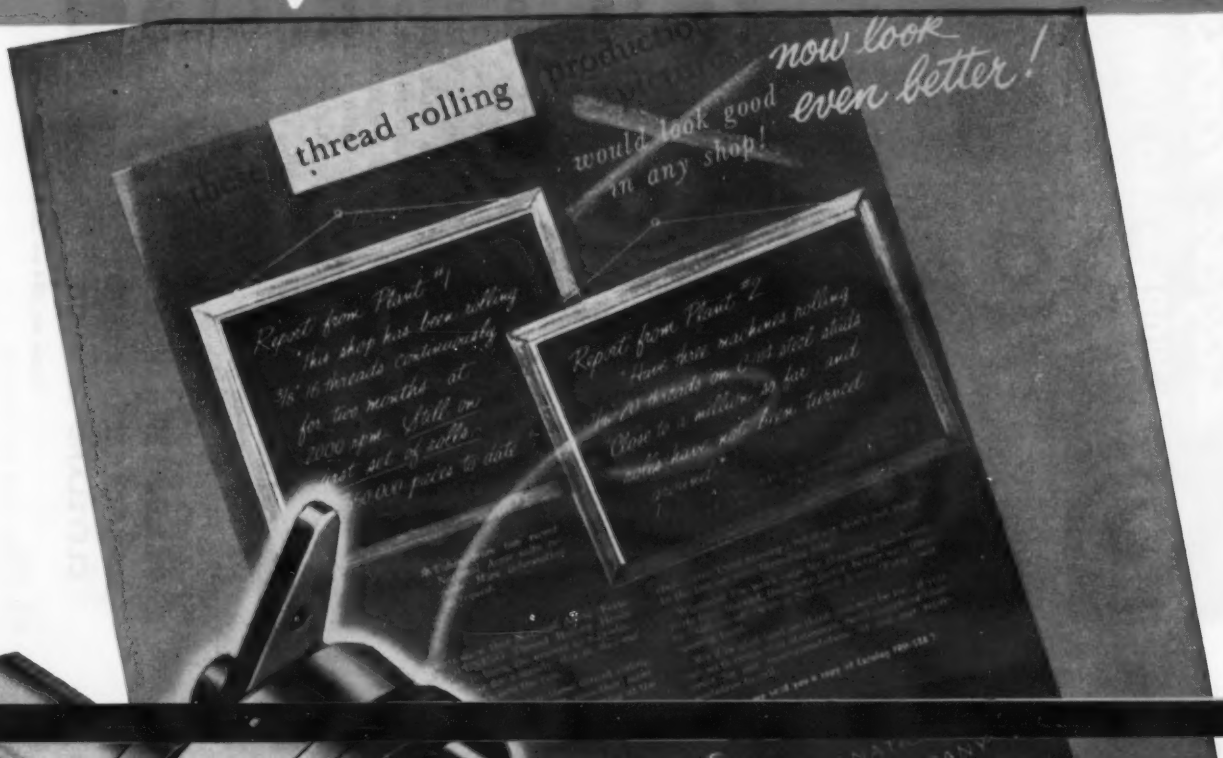
ZAGAR, INC.

23900 LAKELAND BLVD.
CLEVELAND 23, OHIO

Zagar TOOLS For INDUSTRY and SPECIAL MACHINERY

Circle No. 294 on Card, Opposite Page 65

PERFORMANCE FIGURES WITH Acme-FETTE


thread rolling
would look good in any shop!
now look even better!
Report from Plant "1"
This shop has been rolling
5/8" threads continuously
for two months at
2000 rpm. Still on
first set of rolls
and over 50000 pieces to date.
Report from Plant "2"

THREAD ROLLING HEAD
RIGHT ON SCHEDULE! 4 months and another 1,000,000 pieces later, the original set of rolls are still on the job. Have you taken a close look at your threading picture lately?
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OUR JOB: to provide the Right Machine for YOUR JOB

Be sure to get *Acme*-FETTE figures on your threading jobs

THREADING COSTS NOW DOWN TO $0.00005 PER PIECE

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Plastic-Clad Metal

continued

Pistons used in these units must be strong, shock resistant, impervious to oils and indifferent to sharp temperature changes that often range from below freezing in the air to the blistering heat of a paved runway.

The most critical requirement is that metal-to-metal contact between piston and cylinder be avoided to prevent the piston "seizing" inside the cylinder due to effect of weather or hydraulic oil on the metals.

To solve this problem, laminated plastics are used with aluminum to produce the shock-absorber pistons. As developed by Synthane Corporation, the combination consists of specified thicknesses of laminated plastic material permanently bonded to cores of 24ST4 aluminum tubes of various diameters. Machining operations then convert the laminate-covered tubing to piston head bearings.

First operation in production of the pistons is knurling a 38-inch long aluminum tube for its entire length. The knurled ridges provide the necessary anchor for bonding the laminate outer covering firmly to the metal.

The covering itself is a continuous length of specially treated fine-weave cotton fabric impregnated with a phenolic resin.

As the fabric passes over heated pressure rollers to be wrapped around the aluminum tube, the resin softens and the chemical process of polymerization takes place. This fuses the individual layers into a solid mass that cannot be resoftened or reshaped. When sufficient layers of fabric have been wrapped around the tube to build it up beyond the required wall thickness, the tube is oven-cured to complete polymerization. The laminate wrapper is then turned to the proper OD, and the tube is cut to the specified lengths. Synthane then performs more than a dozen machining operations to produce each piston head. Sections are turned, bored, threaded, undercut, chamfered, milled, drilled, and stamped with a part number.

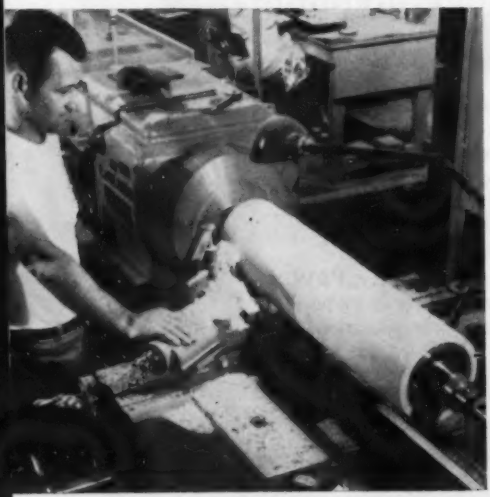
One of the most outstanding attributes of the finished aluminum-laminate piston head is its high strength-to-weight ratio. Also important is the combination's ability to resist the action of the hydraulic fluid. Prime reason for acceptance of the combination, however, is its ability to prevent seizing of the piston and to resist scoring.

These features are also called for in other applications of heavy-duty hydraulic pistons and may find use in other types of equipment.

• • •

KNURLING ALUMINUM TUBING to prepare it for laminate covering.

PRODUCING BONDED-ON LAMINATE COVER on aluminum piston starts with winding resin impregnated cloth onto cylinder.



CURED CYLINDER is turned to required outside diameter.

ONE OF THE MACHINING OPERATIONS (turning internal diameter) performed on laminate-covered aluminum cylinder to convert it into landing strut piston head.

REAMERS

TAPS

KNURLS

CIRCULAR THREAD ROLLING DIES

CUT-OFF BLADES

Screw Machine Cutting Tools

for the long run . . .

. . . because they run longer!

MONOCONE DIES AND HOLDERS

DUOCONE DIES AND HOLDERS

Next time you buy Screw Machine Cutting Tools, remember it's not the purchase price but what you get for your money that really counts . . . how many pieces each tool will deliver *on the production line!*

In correct design and high quality, P&W Cutting Tools are your best buy anywhere. And you can select the tools you need — WHEN YOU NEED THEM — from on-the-shelf stocks at the P&W Branch Office near you.

WRITE TODAY FOR COMPLETE INFORMATION.

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MACHINE TOOLS • GAGES • CUTTING TOOLS

Circle No. 296 on Card, Opposite Page 65

2400 Filler Tubes Per Hour

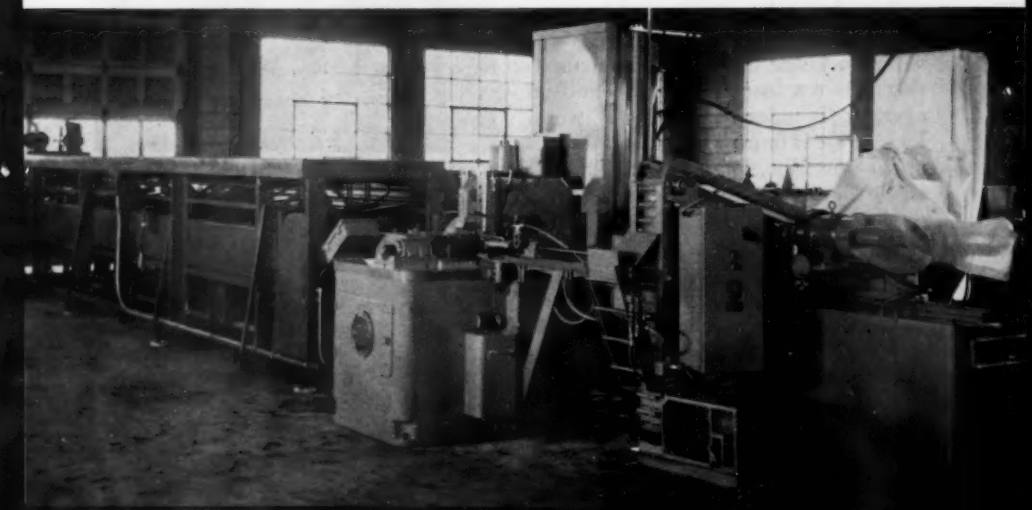
A production installation for cutting off and end finishing as many as 2400 crankcase filler tubes per hour has been delivered to a major automotive company.

Bowling Green, Ohio—A complete installation for automatically cutting off and end-finishing crankcase filler tubes has been delivered to a major automotive company by Grieder Industries of Bowling Green. The package consists of a high-speed Grieder Tube Cut-off Machine fed by an automatic tube hopper, together with a double-end finishing machine for the secondary operation.

Tubes to be produced are of mechanically welded 1⅜ in. OD, .035 wall thickness, mild steel tubing supplied in 22 foot lengths. Specifications call for cutting off tube to lengths of 9.070 in., plus or minus .002 in., and finishing both ends to a burr-free condition. The user expects to operate the installation at speeds governed by the best cycling rate of the end-finishing machine. This means that the Grieder cut-off unit, even cycling at the low end of its 4500 to 6500 pieces per hour rate, will operate only intermittently in the automatic interlocked system. Parts are banked on the conveyor between cut-off and double end machines, and an electro proximity pick-up control unit signals the cut-off when supply of parts at double-end machine is low.

Automatic hopper unit of the sys-

Tube hopper, left, feeds 22-foot tubing lengths to Grieder cut-off, center, which sizes filler tubes. Conveyor then transfers cut-off lengths to secondary operation machine for end finishing.



continued

tem insures an uninterrupted flow of tubing to the Grieder cut-off. Usual tubing feed rate for the cut-off machine, governed by vari-drive control, is 700 feet per minute. In operation, the neoprene-covered feed rolls feed tube stock through the open clamping dies to a stop, actuating a microswitch which cycles the cut-off sequence. After clamping dies are closed, the horizontal blade makes the initial cut in the top of the tube to provide an opening for the vertical knife blade which completes the cut-off in the fast Grieder patented cut-off cycle. This produces a clean cut with minimum burr for subsequent removal.

Cut-off lengths are then pushed along the tube channel to a cascade-type loading station where a conveyor lifts them to a gravity chute feeding the double-end machine.

Secondary operation machine faces the tube ends and makes very slight chamfers on both ID and OD.

JIC standards are met throughout the installation.

A unique accomplishment by Grieder Industries is the fact that standard make hoppers, conveyors and double-end finishing equipment has been grouped with their high speed cut-off machine to produce a very efficient yet low cost automation line package.

Increase Thread Production

Press brake manufacturer is making good use of single-point automatic threading lathe. Machine has achieved up to 98% reductions in time required for threading operations formerly done by milling.

CHICAGO—Dreis and Krump Mfg. Co. of Chicago has reported some interesting results from the use of a Model 1240 Man-Au-Cycle automatic threading lathe in threading various screws and studs used in its line of bending and press brakes. The machine works so much faster than previous methods that it is not loaded full time, and an operator is released for other work. Present use is limited to external threads under 3-in. dia., which handles almost all Dreis and Krump's present production parts, but tooling for a number of internal jobs is planned, according to Walter Wattman, D & K foreman.

Kennametal K21 tips are standard for these operations. An excellent fin-

Dreis & Krump machinist Perry Kreps demonstrates use of Man-Au-Cycle threading lathe in threading a Power Brake Stud, 2½ in. dia., 4½ standard threads per inch, 8 in. threaded length. Part is run at 600 rpm, 32 turning passes, with .006 in. feed per pass. CRS turned and ground stock is thus machined in 2¾ minutes, using Kennametal K21 tip.

Leaders in their class

2 TON and 5 TON PRESS-RITE POWER PRESSES

Model O 5-Ton

$284.25

FOB St. Paul
Complete with motor and starter as shown

Compare Feature for Feature

Note How Many "Long-Life" Features you get with "Juniorline" Press-Rite Presses . . . these are top-quality features you'd expect only on larger presses —at much higher cost!

- **Special High-Strength Frame** with reinforcing ribs at all vital points.
  —Reduces die-wearing deflection.
  —Increases Production between die grinds.
  —Gives 2 to 3 times longer die life.
- **Special Bronze-Bushed Flywheel**
- **Bronze Bearings** in both the main bearings and connecting rod.
- **Bronze Wear Plate** on back of ramways.
- **Greatest Shut Height** for their size! Permits using larger, more bulky dies.
- **Adjustable Ram Gibs** for more precise alignment.
- **Open Back, Inclinable.**
- **Single Stroke Safety** (may be quickly arranged for continuous operation.)
- **Steel Bolster Plate.**

Yes, Press-Rite Power Presses are built-for-the-job. Save money in your plant, switch to PRESS-RITE . . . Top buy in the field!

10 MODELS: 2-Ton, 5-Ton, 10-Ton, 15-Ton, 20-Ton, 30-Ton, 37-Ton, 45-Ton, 60-Ton, 85-Ton.

Write Today for Bulletin 955

SALES SERVICE MACHINE TOOL CO., 2357 University Ave., St. Paul 14, Minn.

used by more . . . for more production

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

Circle No. 297 on Card, Opposite Page 65

continued

ish is obtained, and each piece is held within .002-in. on pitch diameter, .0005-in. on taper.

Some representative results Dreis & Krump has obtained from the Man-Au-Cycle:

(1) Back Gauge Screw
Speed Treat Steel
27-in. threaded length
Diameter 1-in.
Acme thread
4 Threads per inch
Former milling time—70 min.
Man-Au-Cycle time—2 min. 50 sec.

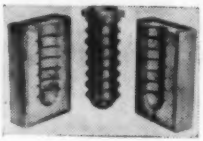
(2) Adjusting Screw
Maxel 3½
Threaded length 6¾ in.
Diameter 2½ in.
Type thread—buttress
Threads per inch—5
Former milling time—140 min.
Man-Au-Cycle time—2 min. 30 sec.

(3) Adjusting screw
Maxel 3½
Thread length 4¾ in.
Diameter 1½ in.
Type thread—Vee
Threads per inch—6
Former milling time—35 min.
Man-Au-Cycle time—1 min.

(4) Adjusting Screw
46A series
Maxel 3½
Threaded length—5 in.
Diameter—1¾ in.
Type thread—buttress
Threads per inch—6
Former milling time—40 min.
Man-Au-Cycle time—1½ min. • • •

With CERRO ALLOYS you can reduce costs of:

Chucking Irregular Work Pieces



Duplicating Master Patterns

Bending Thin-Walled Tubing

—and many other operations such as making dies, anchoring bushings, securing magnets in fixtures, anchoring shafts in Alnico rotors, aligning and securing shaft bearings, etc. CERRO ALLOYS melt at low temperatures and are non-shrinking (even expand slightly) in hardening. Send for literature, mentioning operation in which interested.

CERRO DE PASCO CORPORATION

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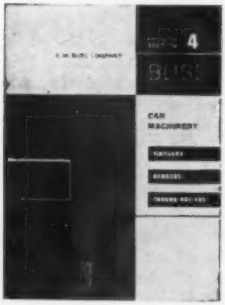
Circle No. 298 on Card, Opposite Page 65

FREE LITERATURE

MACHINE AND TOOL
blue book

(see Number 1.)

(see Number 2.)



(see Number 3.)

1. Profiling Machines. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. Precision machining of jet engine compressor and turbine blades, is the subject of bulletin 50620A. Profile milling, grinding and polishing are described, along with illustrations of typical applications of these operations.

2. Cam Machinery. E. W. Bliss Co., 50 Church St., New York 7, N.Y., The complete line of flanging, beading and thread rolling machinery for medium and high speed can making lines is described and illustrated in catalog 36B, Section 4.

3. Quick Change Tools. The Portage Double Quick Tool Co., 1037 Sweitzer Ave., Akron, O. New P.D.Q. literature has the latest in quick change tools. Holders listed include: straight shank; flange type; R-8 shank; No. 2, 3, 4, 5, 6 and 7 Morse shank; No. 30, 40, 50 and 60 MM shank. Adapters are listed for boring, drilling and milling.

4. Universal Grinders. K. O. Lee Co., Aberdeen, S.D. Catalog describes model BA860 universal grinder; model BA800 tool and cutter grinder; model BA803 chip breaker grinder; and the model BA804 carbide tool grinder.

5. Sandblast Machines. Leiman Bros., Inc., 102 Christie St., Newark 5, N.J. Bulletin 1256 illustrates and describes complete line of sandblast machines for cleaning, deburring, surface preparation, stenciling and matte finishing on metal, glass, plastics and compositions.

6. Bending Tool. Lund Mfg. Co., Biddeford, Me. Brochure describes and illustrates Bendit, Jr., for bending, forming and shaping of metal. Forms which can be made on Bendit, Jr., are illustrated.

7. Arc Welding. Hobart Trade School, Inc., Hobart Square, Troy, O. A series of practical exercises and instructions for developing and improving technique of arc welders is the theme of this 200-page book which is available for $1.00.

8. Infeed Grinding Attachment. Modern Devices, Box 429, Libertyville, Ill. The human element, and all variables have been eliminated with Feedcision, an automatic infeed grinding attachment for boosting centerless grinding production.

Free Literature

continued

9. High Speed Indexing. Ferguson Machine & Tool Co., Inc., Roller Gear Div., P.O. Box 5841, St. Louis 21, Mo. This catalog of Ferguson Drives, No. 106, contains a practical method of increasing production, reducing costs and improving product quality.

10. Mounted Wheels. The Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio. Booklet contains information on maximum operating speeds for mounted wheels. Maximum speed tables are used to facilitate users correct application.

11. Tap Holders and Drivers. Scully-Jones and Co., 1901 S. Rockwell St., Chicago 8, Ill. Bulletin contains specifications and application information on heavy-duty tap holders, close center tap drivers and chucks, and the line of JT compression and tension tap holders.

12. Form Dresser. Monray Corp., 24619 W. Warren, Dearborn, Mich. Bulletin describes the Zenith form dresser for accurate wheel dressing of any combination of radii and angles.

13. Lubricants. Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn. The complete line of lubricants and their uses is described in a new literature packet.

14. Comparator Gages. Metron Instrument Co., 432 Lincoln St., Denver 3, Colo. Bulletin 200 describes all-purpose Metron comparator gages. They are ideal for use in gaging external dimensions of parts having a variety of sizes and shapes.

15. Roller Bearings. McGill Mfg. Co., Inc., Bearing Div., Valparaiso, Ind. Complete data on sizes, capacities, and mounting details are contained in bulletin H-54A.

16. Burring Machine. Modern Industrial Eng. Co., 14230 Birwood Ave., Detroit 38, Mich. Bulletin 103-60 describes the universal Burr-Master, for production gear burring and chamfering.

17. Machine Shop Equipment. Montgomery Tools, Box 1241 Church St. Station, New York 7, N.Y. Catalog P-9 describes the complete line of machine shop equipment and supplies available from Montgomery Tools.

18. Lubrication Systems. C. A. Norgren Co., 3400 S. Elati St., Englewood, Colo. Literature is available describing the centralized Micro-Fog lubrication and Spray-Lube systems.

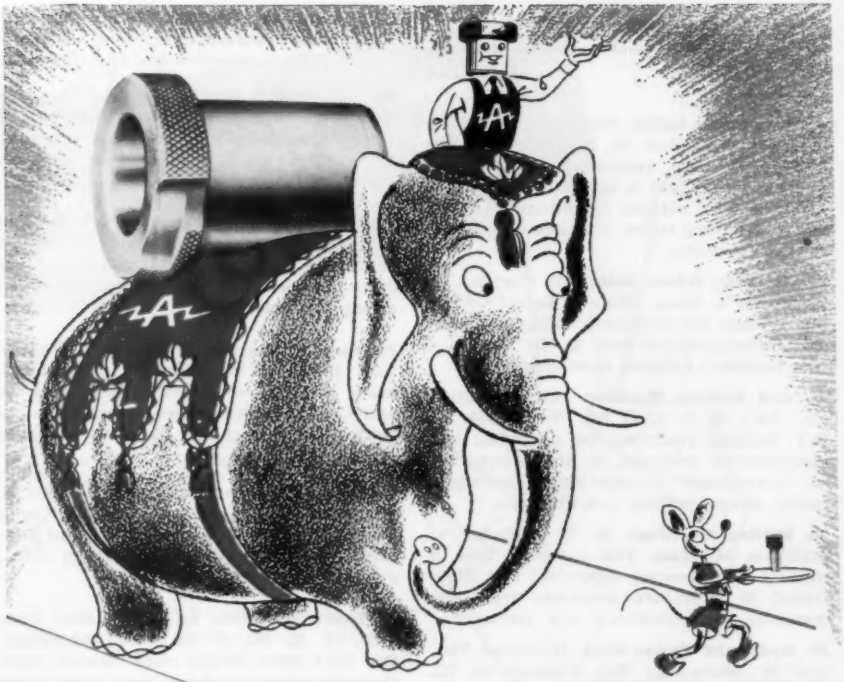
19. Gear Shaving Machine. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. Catalog describes the Red Ring model GCP-24" gear shaving machine that will straight or crown-shave external spur and helical gears.

20. Dial Gages. Nilsson Gage Co., Inc., Box 505, 255 Mansion St., Poughkeepsie, New York. Literature is available describing the complete line of dial gages.

(see Number 9.)

(see Number 10.)

(see Number 11.)



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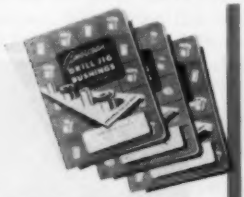

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FROM THE SMALLEST TO THE LARGEST, THE RIGHT DRILL BUSHING IS AN AMERICAN DRILL BUSHING

Circle No. 299 on Card, Opposite Page 65

Free Literature

continued

21. Production Lathe. Sundstrand Machine Tool Co., Rockford, Ill. Bulletin VL-1 describes the new vertical automatic production lathe, that is basically a standard machine with platens for mounting turning or grooving slides, multiple tool slides, or tracer slides.

22. Grinding Wheel Selection. Norton Co., Worcester 6, Mass. "How to Select Grinding Wheels for Precision Grinding, Tool and Construction Steels" is the title of a new booklet available from Norton.

23. Gas Cutting Machine. Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N.Y. Catalog describes the operating and construction features of the Airco No. 50 Travograph oxyacetylene multiple-torch, shape cutting machine.

24. Milling Machines. W. H. Nichols Co., Waltham 54, Mass. The complete line of milling machines are described and illustrated in literature available from the company. Specifications are included.

25. Hydraulic Power Unit. Oil-Dyne, Inc., 2115 W. Marquette Rd., Chicago 36, Ill. The Oil-Dyne power unit eliminates separate solenoid valves, separate relief valves and reservoirs, requires no cumbersome unit base and can be mounted anywhere.

26. Filters. Olson Filtration Engineers, Inc., 1624 N. Kilbourn Ave., Chicago 39, Ill. Literature describes the Olson filter line, along with standard equipment, construction details, accessories and specifications.

27. Tool Post Turret. O'Neil and Knudson Tool Co., 10829 Fawcett Ave., El Monte, Calif. Literature describes the precision hand made O & K self indexing tool post turret.

28. Finishing and Polishing. Production Machine Co., Greenfield, Mass. Type 101 centerless finishing and polishing machines, both high speed and standard speed are described.

29. Rust Preventive. Production Specialties, Inc., 755 Boylston St., Boston 16, Mass. Literature describes Rust-Lick A and C-90 rust preventive compound concentrate and Rust-Lick B, G-25, and B-50 grinding coolant concentrate.

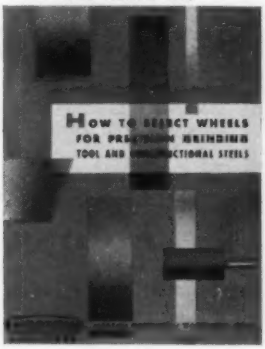
30. Wheel Forming Attachment. Pratt & Whitney Co., Inc., West Hartford 1, Conn. Described is the Model 10 universal Diaform wheel forming attachment for cylindrical type grinders.

31. Tool Steel Chart. Vulcan Crucible Steel Div., H. K. Porter Co., Inc., Aliquippa, Pa. Tool steel brand chart shows more than 300 varieties of tool steel offered for sale by twelve producers.

32. Masking Tape. The Kendall Co., Polyken Sales Div., 222 W. Adams St., Chicago 6, Ill. Described is No. 620 crepe paper masking tape for a multitude of uses.

(see Number 21.)

(see Number 22.)



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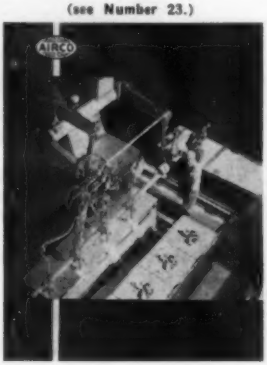

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Star was the first to successfully use molybdenum to make "Moly"® High Speed Steel Blades that would be tough, carry the load, retain sharpness and embody all the other high qualities and properties of heavy-duty blades.

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1956

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Mowers.

Circle No. 300 on Card, Opposite Page 65

Free Literature

continued

33. Hand Tools. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N.Y. Nine new hand tools for the sheet metalworker are introduced in bulletin 78. They are leverage shears, straight snips, and combination snips.

34. Material Handling. Bathey Mfg. Co., Plymouth, Mich. New catalog describes the Bathey line of material handling and shop equipment, including work-station and storage systems.

35. Wire Rope Recommendations. American Cable Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa. Each recommendation covers such points as rope diameters, construction, preforming, lay, grade and core, weights and breaking strength.

36. Drill Press. Portomag, Inc., 1511 E. Nine Mile Rd., Ferndale 20, Mich. Bulletin describes the Portomag portable magnetic drill press, for bringing drill press accuracy right to the job.

37. Riveting Machine. Power Brake Parts Mfg. Co., 3441 S. Racine Ave., Chicago 8, Ill. The pneumatic Model A-7 riveting machine for riveting, perforating, punching, staking, swaging, pressing and crimping.

38. Speed Reducers. Revco, Inc., 2 E. Franklin Ave., Minneapolis 4, Minn. Catalog describes the principles of operation of the Zero-Max infinitely variable speed transmission with output speeds from true zero to ¼ input speed.

39. Hydraulic Valves. Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass. Catalog 261 describes the Series 6000 solenoid operated sub-plate mounted hydraulic valves.

40. Strainers and Air Eliminators. Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. Bulletin OG-326 describes and illustrates the Rockwell line strainers and air eliminators.

41. Air Power Unit. Renco-Aire Devices, 819 N. Reynolds Rd., Toledo 7, O. Bulletin describes the Renco-Aire automation package, air-powered unit for converting hand powered machine tools to fully or semi-automatic operation.

42. High Strength Bolts. Russel, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y. Booklet gives the man on the job practical working information on high strength bolts.

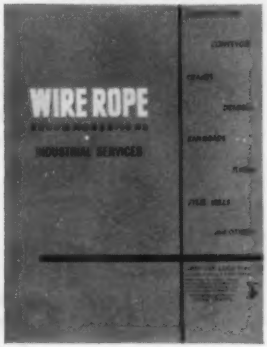
43. Precision Molded Products. Equipment Sales Div., Raybestos-Manhattan, Inc., 6010 Northwest Hwy., Chicago 31, Ill. A new engineering bulletin No. 550, on precision molded products for automotive, industrial and household appliance.

44. Planer and Shaper Tool. R. B. Tool Co., Inc., 785 N. Broadway, White Plains, N.Y. Bulletin describes new No. FH planer and shaper tool that features swivel head with adjustable swing action.

(see Number 33.)

(see Number 34.)

(see Number 35.)



Stone M-35A

cuts faster, cleaner, at lower cost

than any machine of its type!

Capacity: Ferrous 1½" Solids, 2½" Standard Pipe and 2½" Structurals. Non-Ferrous, 2½" Solids, 3" Tubing and Extrusions.

Model M-35A
12" Cut-Off Machine

The Stone M-35A cuts with a milled finish to a tolerance of ±.005" any degree up to and including 45°—either direction. Positive geared-in-head drive, a Stone exclusive, delivers *complete* power to the cutting wheel. Cuts ferrous and non-ferrous solids at the rate of less than 4 seconds per square inch! Precision-engineered, rugged and durable. Motor is 3½ HP, enclosed, fan cooled, induction type 220/440 volt, 60 cycle, 3 phase (other voltages on request).

Machinery by Stone includes a complete line with many optional features. Write for complete information, no cost or obligation.

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STONE MACHINERY CO., INC.

11 Fayette Street, Manlius, New York

Circle No. 301 on Card, Opposite Page 65

Free Literature

continued

45. Band Saws. Wells Mfg. Corp., 707 Coolidge Ave., Three Rivers, Mich. Catalog gives descriptive data and specifications for the complete line of metal cutting band saws ranging in capacity from 3½" x 6" up to 12" x 16".

46. Metalworking Equipment. Waterbury Farrell Foundry & Machine Co., Waterbury, Conn. Booklet gives a comprehensive picture of the four basic lines of metalworking machinery built by the company.

47. "Comparison of Carbon and Alloy Steels for Pressure Vessels" is the title of a new booklet available from Lukens Steel Co., Coatesville, Pa.

48. Chemical Finishing of Metals. J. W. Rex Co., 834 W. 3rd St., Lansdale, Pa. Booklet helps design engineers and purchasing agents find new ways to cut manufacturing costs through substitution of low-cost, "treated" base metals.

49. Power Tools. Delta Power Tool Div., Rockwell Mfg. Co., 450 N. Lexington Ave., Pittsburgh 8, Pa. Booklet illustrates and explains advantages of teaming standard industrial power tools with special-purpose machine tools.

50. Cut-Off Blades. Somma Tool Co., Inc., 15 Brown St., Waterbury, Conn. New line of super high speed steel cut-off blades with a superior hardness that permits unusually high speeds and feeds on automatic screw machines is described.

51. Hack Saw. Sales Service Machine Tool Co., St. Paul 4, Minn. Bulletin covers the new larger capacity Jefferson 601 power hack saw which will now take 4" x 4" square members or 4" od rounds and pipe.

52. Oxide Cutting Tools. Stupakoff Div., Carborundum Co., Latrobe, Pa. Bulletin describes the new high-strength oxide cutting tools which are said to outperform other tools two to ten times.

53. Milling Cutters. Star Cutter Co., 34500 Grand Ave., Farmington, Mich. Bulletin describes tolerance standards for the Star line of multiple-thread milling cutters, shell and shank type.

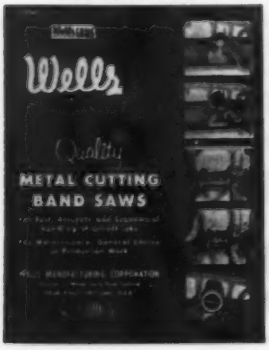
54. Standardized tool devices for fixtures jigs and dies, are described and illustrated in a new brochure from Siewek Tool Co., 2862 E. Grand Blvd., Detroit 2, Mich.

55. Monochromatic Light. Spitfire Tool Co., 2931 N. Pulaski Rd., Chicago 41, Ill. New accurate, portable and compact Mono-Lite, is said to assure accurate reading for flatness to .0000116.

56. Cylinders. Tomkins-Johnson Co., Jackson, Mich. Bulletin gives mounting dimensions and specifications on eight standard styles of T-J Spacemaker cylinders, offered in 1" to 3" bores.

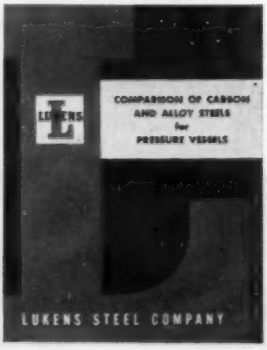
57. Liquid Springs. Taylor Devices, Inc., North Tonawanda, N.Y. Literature describes new line of liquid springs that offer concentrated high force.

(see Number 45.)



(see Number 46.)

(see Number 47.)



CUT REPLACEMENT COST More than Half

with NEW T-J REAMERS

RIGHT HAND SPIRAL
RIGHT HAND CUT

LEFT HAND SPIRAL
RIGHT HAND CUT

REPLACE ONLY THE PART THAT WEARS OUT!

1. Cuts replacement cost to less than half!
2. Quick change of heads saves time.
3. Easy to change heads for different metals, increases efficiency.
4. Head and arbor firmly locked together.
5. Wide range of sizes.

Exclusive in design . . . the New-type T-J Reamers cut your replacement costs to *less than half!* Only the quickly installed *head* to replace, after buying original shank. Wide range of interchangeable heads from ½" to 2¾" inclusive, in 1/16" increments are available with right or left hand spiral flutes for thru or blind hole reaming.

Tapered hole in head insures concentricity and *new* thread design assures a snug fit on smoothly ground tapered shank. Reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief. Backed by T-J's 39 years of know-how as one of the largest manufacturers of die sinking milling cutters.

Tomkins-Johnson Co., 617 North Mechanic Street, Jackson, Michigan.

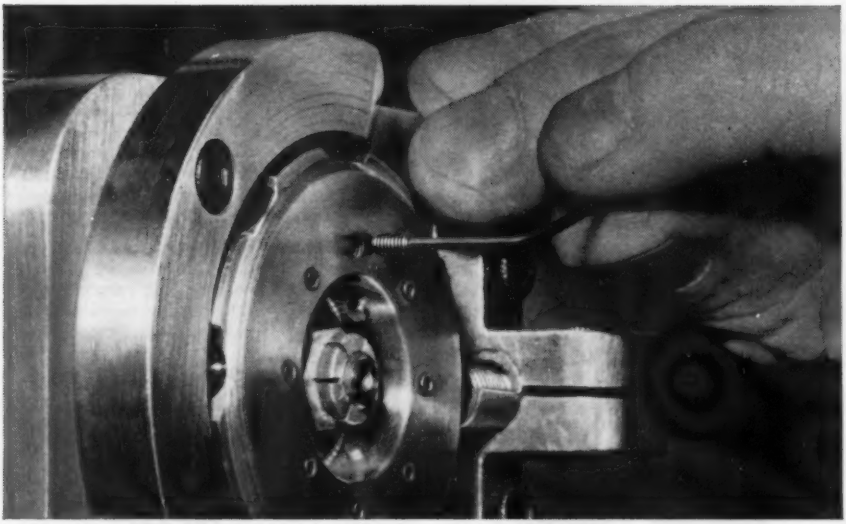
Exclusive, high potential territories open to responsible manufacturers representatives. Write today!

T-J TOMKINS-JOHNSON

RIVETERS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHERS

39 Years Experience

Circle No. 302 on Card, Opposite Page 65



Microsize UNBRAKO socket screws simplify design problems—even in highly specialized equipment like this prototype precision loading device for use in advanced automated production operations.

Miniaturize with UNBRAKO set screws

You need not design special set screws to secure your new miniaturized equipment. Microsize UNBRAKOS were developed specifically for use in modern small devices.

UNBRAKO screws are made of carefully selected alloy steel. They are manufactured to timepiece precision. Sockets are deep and uniform for greatest wrench engagement and longest reuse. Threads are fully formed for maximum strength and exact fit. And UNBRAKOS are heat treated to the optimum condition for high tensile strength and ductility without brittleness or decarburization.

Ask your authorized industrial distributor about microsize UNBRAKO socket screws today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 52, Pa.

STANDARD PRESSED STEEL CO.

UNBRAKO **SOCKET SCREW DIVISION**

SPS

JENKINTOWN PENNSYLVANIA

Circle No. 303 on Card, Opposite Page 65

AMES

Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators:—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

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28 Ames Street, Waltham 54, Mass.

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Circle No. 304 on Card, Opposite Page 65

Fixture Clamp for Thin Bar Material

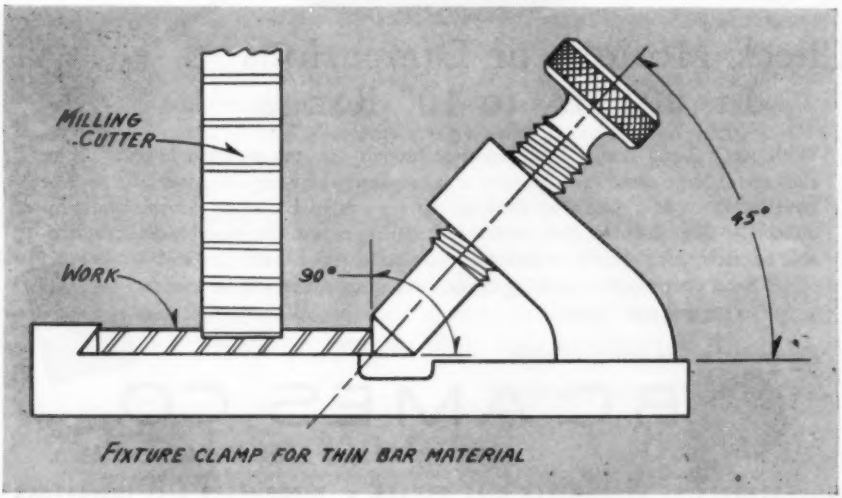
by **H. J. Gerber**

The illustrated clamp screw has been very successful when built into a simple fixture for holding thin flat bar material for milling.

The holding device consists of a series of screws which are pointed off at a 90 degree included angle. These thumb screws are supported in welded-on brackets which have been drilled and tapped at exactly 45 degrees to the base surface of the fixture.

Tightening of the screws against the stock puts both a downward and a cross component of pressure toward the two locating surfaces of the fixture. The side locator of this fixture consists of a dovetail type of gripping edge which prevents any upward lift of the work on the side opposite the clamp screws.

This clamping method has proven effective in accurately seating material even as thin as 3/32".



FIXTURE CLAMP FOR THIN BAR MATERIAL

MICROBORE

FLASH CHANGE® the ultimate in QUICK CHANGE TOOLING

For General Purpose Work and Production Applications . . .

- A comprehensive range of Standard Microbore Flash-Change boring and milling equipment is available for tool work and general purpose machining.
- A complete service is available for engineering and manufacturing special Microbore Flash-Change equipment for all types of production operations.

Write for illustrated Flash-Change Catalog

DEVLIEG MICROBORE® DIVISION OF DEVLIEG MACHINE COMPANY

Circle No. 305 on Card, Opposite Page 65

continued

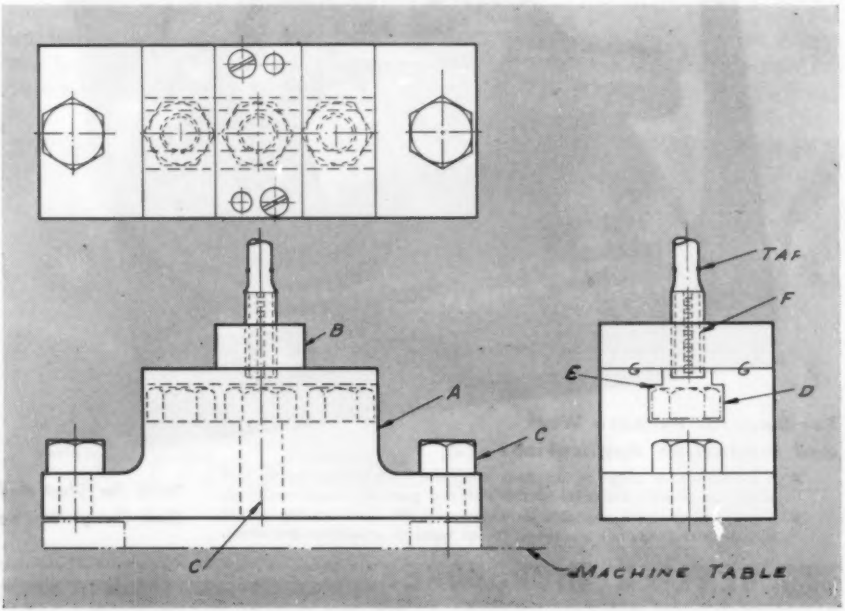
Production Tapping Fixture

by **Alex S. Arnott**

For tapping large quantities of hexagonal nuts with special threads the tapping fixture shown was made and used with success. It was made to facilitate feeding the work with the left hand while the operator tapped the nuts with the right hand, and it may be used for hand tapping or machine tapping, whichever is preferred.

The fixture is a cast iron body (a) with a chip relief at (b), hold down bolt holes at (c) and a keyway milled thru it at (d) with a clearance for the work at (e). The bar (f) is mounted on the fixture and the tap (h) is tapped thru it as a permanent part of the fixture.

In operation the work is passed thru the key at the left hand end of the fixture and as they reach the approximate position of the tap the operator lowers it making contact with the nut hole and tapping the work. After releasing the tap the completed work is pushed along and the next nut is ready for the tapping operation.



"RODGERS PLATEN PRESS GIVES US

FAST CYCLING WITH COMPLETE SAFETY"

—SAYS VEIT AND YOUNG

Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from 1/2" to 1/8" thick with bends up to 90°.

Auxiliary cylinders lower and raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—*faster* with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.

HI-PRESSURE Rodgers HYDRAULICS

Rodgers Hydraulic Inc.

7453 WALKER STREET • MINNEAPOLIS 26, MINN.

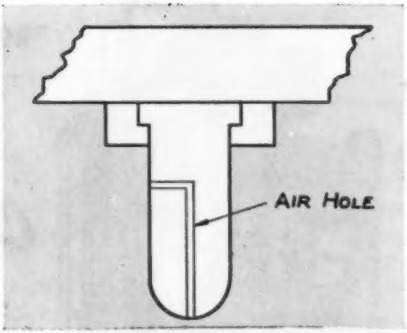
Circle No. 306 on Card, Opposite Page 65

continued

Air Escape Hole

by **E. Pochervina**

Drill air escape hole as shown to keep tops from being blown out of drawn cups. Without air hole, air trapped in front of punch exerts a terrific amount of pressure. By drilling hole, this condition is remedied.

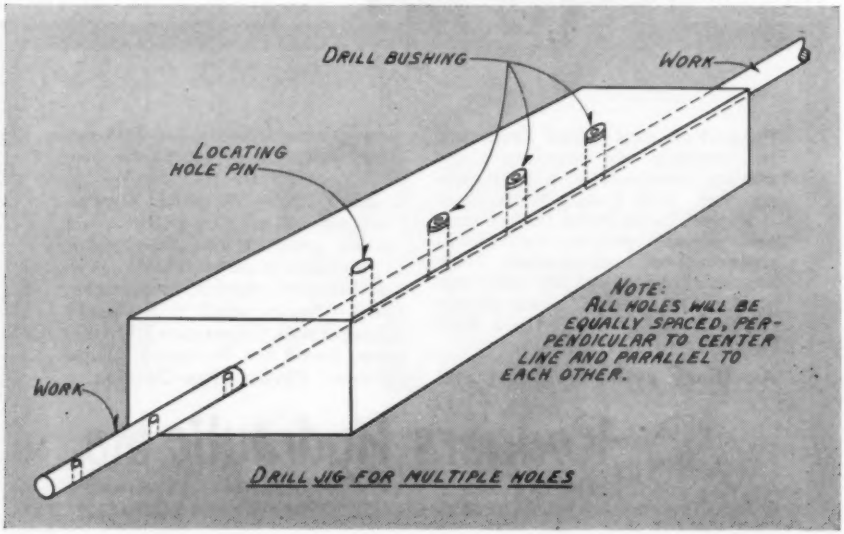


Jig for Drilling Multiple Holes in Round Work

by **Joseph Saproni**

The sketch shows a simple drill jig for drilling equally spaced holes in round stock. The device is easy to make, being a piece of rectangular steel bored to rod size plus clearance, with one locating hole and three bushing holes in the top of the jig.

After the first hole is drilled, the drift pin is put in place in the locating hole, and the jig is held firmly in place while the next three holes are drilled. Then the pin is removed, the jig is moved along the work until the drift pin lines up with the last drilled hole, and the process is repeated. If extra long rods are to be drilled, the rectangular block can be made larger than needed, and a section of the block can be cut off and used to support the far end of the work.


DRILL BUSHING
WORK
LOCATING HOLE PIN
NOTE: ALL HOLES WILL BE EQUALLY SPACED, PERPENDICULAR TO CENTER LINE AND PARALLEL TO EACH OTHER.
WORK
DRILL JIG FOR MULTIPLE HOLES

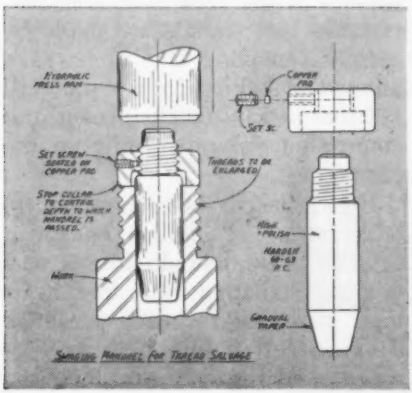
continued

Swaging Mandrel for Thread Salvage

by **H. J. Gerber**

The threaded nipples on a large number of bronze castings for water manifolds were machined about .006" too small on the pitch diameter of the threads. These expensive parts had to be salvaged, if at all possible, and the following simple tooling proved to be very successful in the expanding of the nipples to the required thread diameter.

A hardened and ground and highly polished swaging mandrel was made up of tool steel. The mandrel was machined to fit tightly into the drilled hole through these nipples. It was made oversize in the holes to an amount equal to a few thousandths over the desired amount of expansion. This swaging mandrel had a very gradual lead taper on its leading end to facilitate entry into the hole and was provided with a threaded stop collar to control the depth to which it was pressed into place. The mandrel was forced into the hole on a small hydraulic arbor press.



SWAGING MANDREL FOR THREAD SALVAGE

"CUT KEYWAYS FOR A CENT A PIECE? IT'S A CINCH WITH THIS *Minute Man*® KIT"

That's right. For as little as one cent and in just one minute you can cut a keyway with a *Minute Man* Keyway Broach Kit. For keyways from 1/16" to 1" in any bore from 1/4" to 3".

Minute Man Broaches for square and hexagonal holes and Production Type Keyway Broaches are also available from stock at your Industrial Distributor's.

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MAIL FREE BROACH CATALOG AND PRICE LIST T, describing 26 standard kits, 49 standard broach sizes, 59 standard bushing sizes and a wide range of SPECIAL BROACHES to

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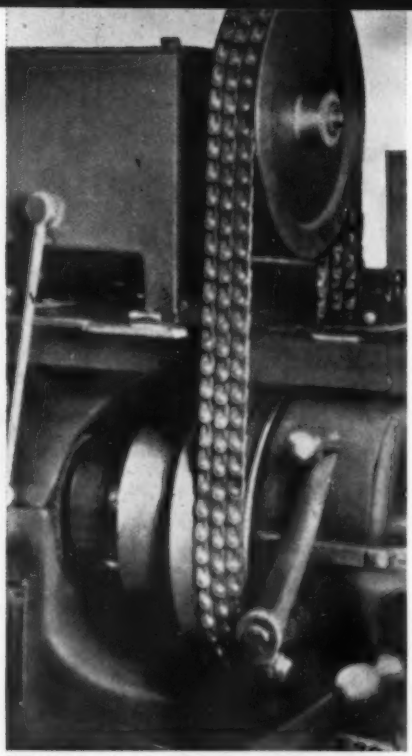

FIG. 1—Fixed centers.

Adjustable Vee Belts

No dismantling of equipment; install around obstructions

By **S. Spatz**
Brammer Corp., New York

● Do you encounter difficulties with endless belts where outboard bearings, or other obstructions, form a part of the drive?

An adjustable belt is made of individual links joined together, by means of studs, into a continuous strand and links may be added, or removed, to obtain a required belt length. All links are manufactured uniformly, making it simple to match belts and to maintain proper belt tension. Consider the following illustrations, for perhaps you have a drive of similar nature in your plant.

Take, for instance, a 100 hp compressor drive involving a short distance between centers and a large speed ratio. Considering all factors, the most suitable drive is the multi-v belt. But if endless belts are used it would mean that the bearings on both shafts would have to be taken apart completely and the shafts would have to be jacked up every time the belts had to be replaced.

On the other hand, adjustable link belts are installed quite easily with very little time lost for the work and preventing serious production losses. The individual adjustable belt strands are made by merely removing the necessary amount of belting from a standard 100 foot reel in the store room, and connecting the open ends on the job.

Fig. 1 clearly shows how the replacement of endless belts can sometimes be difficult. In this particular installation the frame, bearings, shafts and sheave must be dismantled before belts are replaced and the entire machine as-

All Tool Steel Looks The Same

The Difference Shows Up Later!

PRK-33—Air Hardening, Non-Deforming Cobalt, High-Carbon, High Chrome. For high production blanking, forming, drawing, trimming and shearing.

NEOR—The Original Oil Hardening, Non-Deforming High Carbon, High Chrome. Recognized as the ideal lamination die steel. Also suitable for other long run dies.

MINEOR—5% Chrome, Air Hardening, Non-Deforming. Has many desirable features of more expensive air hardening steels. Tough at high hardness.

OHT—Oil Hardening. Non-Deforming. Excellent machineability, minimum distortion, good resistance to wear. An economical steel for short run dies.

"MT6"—The Standard "M2 Type," High Speed Steel. Designed for a superior tool and at the same time save critical alloys.

And that difference often means money and time wasted. Judge Darwin tool steels solely on performance—how others have profited by its use—by thorough trial in your own plant. Darwin tool steels, used as recommended by our engineers, outperforms and is a better steel for the money than you will buy elsewhere. Call or write today, we'll be glad to help solve any tool steel problem.

Furnished in bar stock, billet, forging, sand casting. Drill rod, flat ground stock, tool bits. Bulletin on Request.

DARWIN & MILNER Inc.

highest grade tool steels

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Circle No. 308 on Card, Opposite Page 65

sembled before production could get under way. The link type of belt is desirable for an installation can be completed quickly with very little down time. In addition the centers are fixed and there is no method of take-up in the event that belts become slack. With the link vee belt any adjustments are made conveniently and damaged links are repaired easily from the reel in the store room.

Fig. 2 illustrates the adjustable belt on a drive that is completely enclosed. It saved many hours of labor and only a reel or two of belting is stocked for repairs. Although the center distances are long, the link belts take the pull without slip and there is no question about having to take any of the equipment apart.

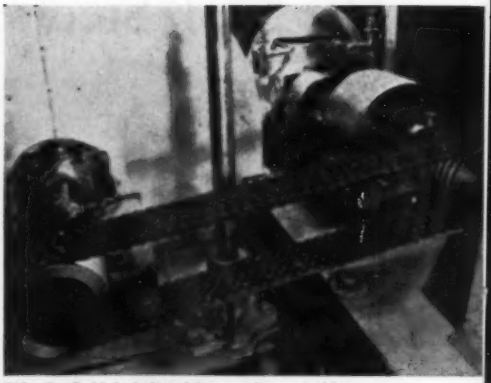


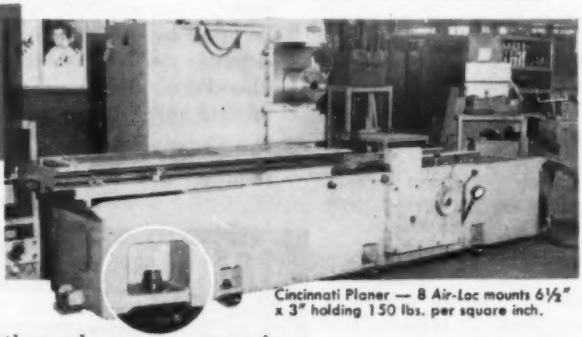
FIG. 2—6 Link belts drive a steam turbine.

The link construction of an adjustable belt permits good flexibility. Thus bending stresses are kept. low.

Now You Can Install a Planer Like This With a $12.95 Set Of "PACKAGED FLATS" Of Air-Loc®

4 • 17 • 4

- vibration & noise reduced up to 84%
- no bolting or using messy cement
- just sit the machine on Air-Loc and push the "Start" button.



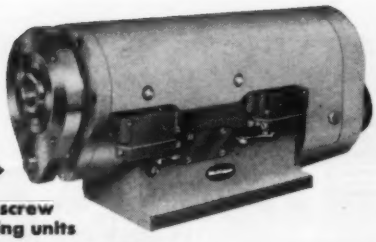
Cincinnati Planer — 8 Air-Loc mounts 6½" x 3" holding 150 lbs. per square inch.

Over 3,000 presses, lathes, planers, are now installed on patented *Air-Loc* mounts. You can re-use *Air-Loc* when machines are moved.

Order your 9" x 18" set of *Air-Loc* "Packaged Flats" now. Only $12.95 postpaid. Satisfaction guaranteed.

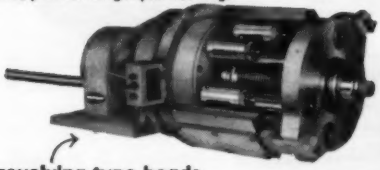
AIR-LOC DIVISION
Clark, Cutler, McDermott Co.
3 W. Central Street
Franklin, Mass.

Circle No. 309 on Card, Opposite Page 65



lead screw tapping units

Single-spindle or multiple-spindle, and, plain or flange quill mounting.



revolving type heads

Mount vertical on any center-column machine with rotating chuck.

hydraulic index tables

Simple design—maximum safety—completely hydraulically operated.

use

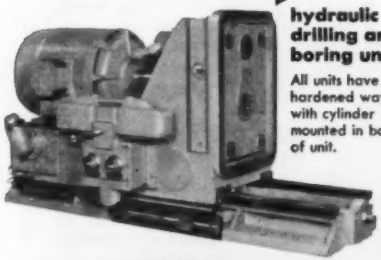
Michigan

Components

... For Faster, More Economical Production

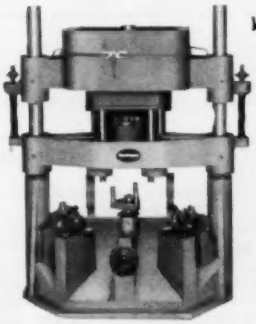
Here are a few typical examples of Heads, Bushing Plates, Fixtures, Automatic Index Tables, Hydraulic Drilling and Boring Units, and, Lead Screw Tapping Units used by Machine Tool Builders and Manufacturers, who insist upon the finest, when building or re-tooling.

We also build Revolving Heads for Chucking Machines.



hydraulic drilling and boring units

All units have hardened ways, with cylinder mounted in bottom of unit.



multiple drill heads

Adapted for any type drill press and feed units. Shown with bushing plate and fixture.

We solicit your inquiries on any of your Multiple Drilling Problems.

Michigan DRILL HEAD CO. Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

Circle No. 310 on Card, Opposite Page 65

SHELDON

CHICAGO

Sheldon's larger, wider "Zero Inspection", Tapered Roller Spindle Bearings save you money by making these lathes better in 6 ways.

Write for G-55 catalog showing new 10" 11" and 13" swing, bench, cabinet and pedestal mounted Sheldon Precision lathes.

1st They *meet* Sheldon's high standard for accuracy—each bearing has a run out limited to .00015"

2nd They absorb thrust and radial loads beyond requirements—basic rating on front bearing at 500 R.P.M.

for radial loads.....3540 lbs.
thrust loads.....2335 lbs.

3rd They *end* costly bearing maintenance—require only a fractional turn of bearing take-up after long periods of service.

4th They *hold* the spindle in rigid alignment while permitting it to turn freely at high or low speeds—the line contact between rolls and races, and the opposing taper design, preclude lateral movement or end play.

5th They *minimize* friction—smooth mirror finished rollers and races running in light oil, deliver more horsepower at the Spindle Nose and lower power costs.

6th They *increase* work capacity. Larger than similar type bearings on other lathes in this price range, these bearings make it possible to turn out *more work* and *better* work at lower costs.

SHELDON MACHINE CO., INC.

4242 NORTH KNOX AVE. • CHICAGO 41, ILLINOIS

Circle No. 311 on Card, Opposite Page 65

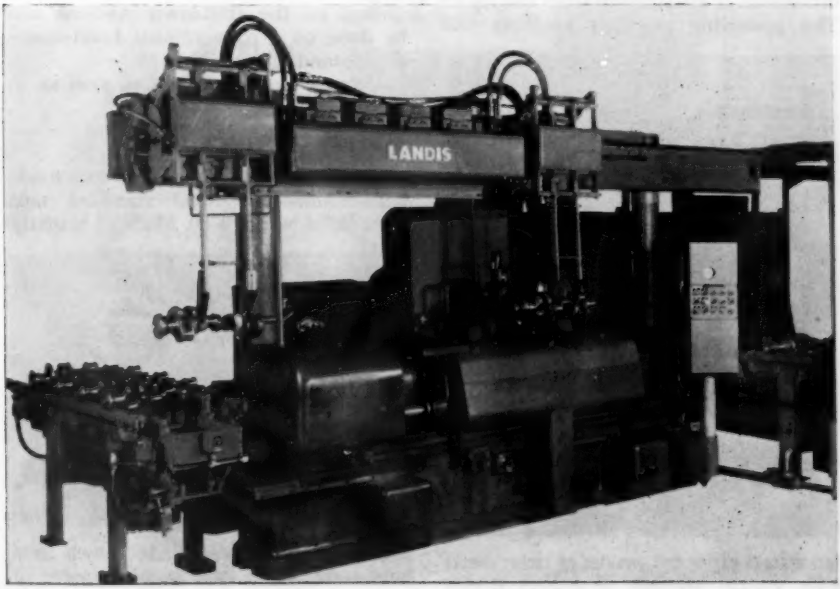
Edited by **D. M. Carlson**

Automatic Grinding Line for Crankshaft Pin Bearings

Crankshaft pin bearings can now be ground automatically to precision limits without the necessity of manually loading machines and interrupting cycles to index the shaft for each pin. Production is increased and quality improved.

Automatic gaging, including gaging of the workpiece during the grinding cycle and also between stations is the main feature of an integrated production line for V-8 crankshaft pins developed by Landis Tool Co., Waynesboro, Pa.

The line consists of four standard Landis crankpin grinding machines synchronized electrically, hydraulically and mechanically. Landis-designed loaders



One of four Landis automatic hydraulic crankpin grinders with automatic loading and transfer equipment and automatic sizing. Machine shown grinds diameter and sidewalls of No. 4 pin of V-8 crankshaft. Shaft is then transferred to other three machines to complete pin grinding operations. Production estimate is 50 shafts per hour.

move the crankshafts from one machine to another.

Crankshafts are automatically loaded, positioned and hydraulically chucked.

The grinding wheel moves rapidly into position to grind the sidewalls and diameter of the first crankpin of the revolving crankshaft. The diameter is ground to a predetermined size within limits of .0005-in. An automatically-positioned in-process double contact air gage controls the grinding cycle to final size.

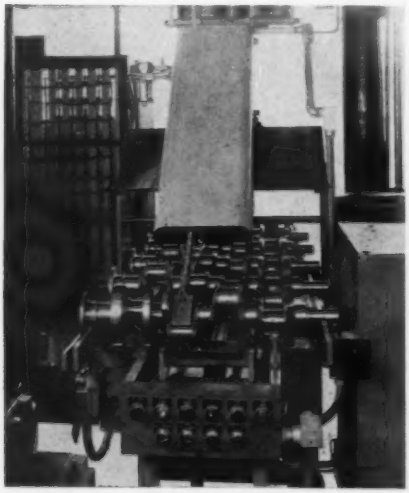
Withdrawal of the grinding wheel signals the loaders to again handle the crankshafts. The shaft from the first machine is moved to a conveyor between the first and second grinders. On the conveyor it is automatically inspected for proper diameter, width and taper. If any of the dimensions do not pass inspection, signal lights show which dimension is in variation from the limits. The preceding grinding machine will stop cycling until the correction is made. A set of visual gages shows the inspection sizes so that the operator knows how much correction to apply.

This pickup, grind, pickup, inspect cycle continues through the four machines until the crankshaft is finished. All grinders and loaders are in continuous cycle so that four crankshafts are being handled at all times.

Conveyors between grinders store a number of crankshafts. A particular machine loader will not operate unless there is a crankshaft ready for loading and a vacant space on the next conveyor to deposit a finished shaft.

When it is necessary to shut down one machine for changing wheels or regular maintenance, the other three machines will stay in operation, and crankshafts are by-passed around the machine that is down. The operation missed on the shutdown machine can be done on a conventional hand-operated, stand-by machine.

Use ACTION Card, opposite page 64. Circle No. 81



Post process gaging unit mounted on racker checks width, diameter and taper of crankpin grinding operation on preceding machine. When work is not within limits, grinding cycle of machine preceding gage is held up until size correction is made. Reset button then starts cycle.

Hand tapping tool

The Taprite is an accurate tool made to accommodate most standard taps from ½" down to 0-80. Made of brightly

finished hardened steel, it comes in a hardwood block which holds one of each size of tap, both coarse and fine. Griffith Tool Co., Dept. RB, 237 E. Crescent, Elmhurst, Ill.

Use ACTION Card, opposite page 64. Circle No. 82

Safe punch press

Kenco Mfg. Company, Dept. KE, 5211 Telegraph Rd., Los Angeles, now offers a 15-ton deep-throat punch press with the same safety and mechanical advantages recently introduced in the Kenco 15-ton Electro-Safe standard model.

Punch press has no flywheel; there are no stored-energy and double-tripping hazards. Mechanical clutching, too, has been eliminated. The stroke results from an electrical surge which starts the motor from a dead stop. Motor goes dead again at the end of the stroke cycle.

Two single-trip buttons are widely spaced to keep operator's hands clear of danger zone. The operator must push both buttons at once . . . hold them

1200 3/4" TUBE ENDS PER HR.

Deburred AND Faced

ON PINES END-FINISHING MACHINE

At Tube Processing, Inc., Indianapolis, the Pines No. 600 End-Finishing Machine, illustrated at right, is today performing combination facing and inside and outside deburring operations on 3/4" x .035" x 15" steel tubes at average net production rates of 1200 tube ends per hour. On smaller jobs, 1/4" and 3/16" steel tubes, net production averages up to 2000 ends per hour. The machine is equipped with air-operated clamp and foot pedal control.

Fast, Accurate Work

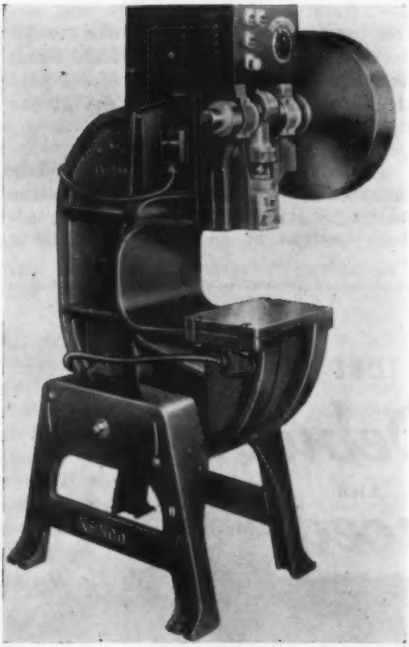
These outstanding performance records are typical of fast, accurate results achieved in other plants on all kinds of deburring, facing, chamfering, pointing, and reaming operations. This is because the machine is designed to clamp and feed work to the rotating cutters in one pass. This enables the operator to work more efficiently with less fatigue. Small and compact, the Pines No. 600 handles stock diameters up to 2". Maximum feed stroke is 1-1/4". Larger models for stock sizes up to 5" are also available.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
698 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

FREE BULLETIN
Write for facts on how these machines cut production costs.

Circle No. 312 on Card, Opposite Page 65



until stroke reaches bottom, then release both buttons to start a new cycle. A heavy-duty safety brake applies whenever power is disrupted or disconnected, and a safety stop button halts the press instantaneously at any point in the cycle. Any failure, mechanical or electrical, will fail safe.

Controls permit the operator to change from "single trip" to "continuous stroke," "inching," or two-hand or foot control by merely turning a dial. This selector switch can be locked in position so that operator can't expose himself to danger by varying the setting. Timing can be changed in seconds by resetting a cam. The press offers single-trip speeds up to 60 strokes per minute, and continuous operation speeds of 190 strokes per minute. Fewer or more strokes may be obtained for special work.

Use ACTION Card, opposite page 64. Circle No. 83

More power for mill

Ball Machinery Co., Dept. RB, 939 W. Lake St., Chicago distributor, has announced the addition of important improvements in current models of the Abene milling machine. This is a combination machine which performs three operations with one work setting—vertical, horizontal and angular milling.

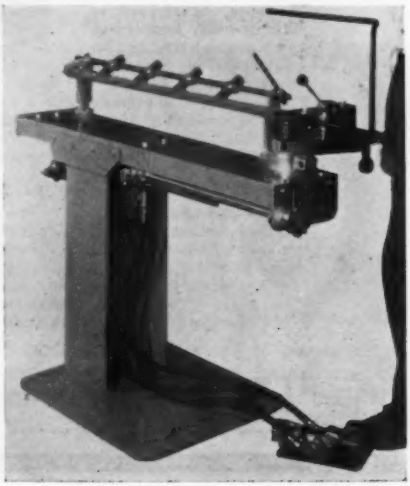
A new spindle drive, making it easy to adjust the V-belt to compensate for stretch, has been introduced, and the spindle has been redesigned and is now equipped with a 4 h.p. motor. The increase of horsepower in this milling machine now gives it twice as much power as heretofore, resulting in faster, smoother operation.

Other specifications are: table size 40″ x 10¼″; 22″ longitudinal table travel; max. distance spindle to table 20″ in either vertical or horizontal position; 12 longitudinal power feeds; 12 spindle speeds 50-1300 rpm; spindle taper No. 40 n.t.; weight 2550 lb.

Use ACTION Card, opposite page 64. Circle No. 96

Air powered tube bender

The Curvit 105 air-powered tube bender is made for production of tubu-



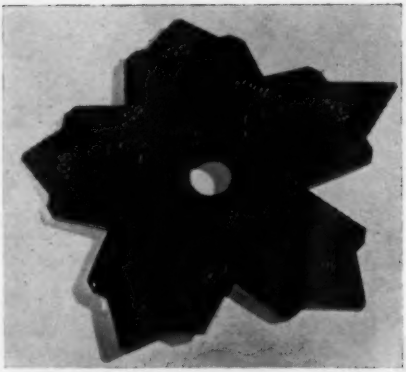
lar furniture and other products using steel tubing of ½", ⅝" and ¾" diameter.

Five hundred bends an hour can be made. If there are several bends in one piece, the piece can usually be left in the machine until all are completed. The tube to be formed is put in the length gage running along the top of the bender, and after each bend is drawn forward to the next stop. Besides the four or more length stops provided, there are four angle of bend stops so that four different bends can be made as well. A four place indexed head, operated from the front of the machine, controls the angle of bend. Bending is accomplished through a double-roll, self-aligning fixture. Kilham Engineering, Inc., North Attleboro, Mass.

Use ACTION Card, opposite page 64. Circle No. 84

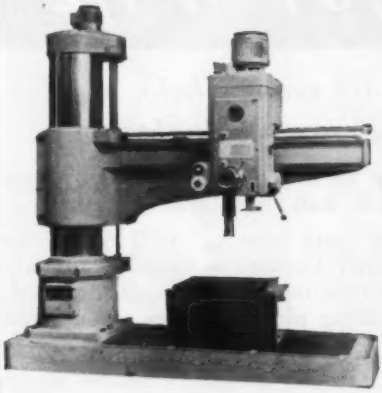
Free countersink gage

The Dayton Rogers Mfg. Co., Dept. RB, 2824 13th Ave. South, Minneapolis 7, Minn., has available for free distribution a standard countersink gage for calibrating both countersink tool as well as the finished countersink machined section of the work.



Details are graduated for the various angular standard countersink for both machine and wood screws. Request on company letterhead.

Use ACTION Card, opposite page 64. Circle No. 85



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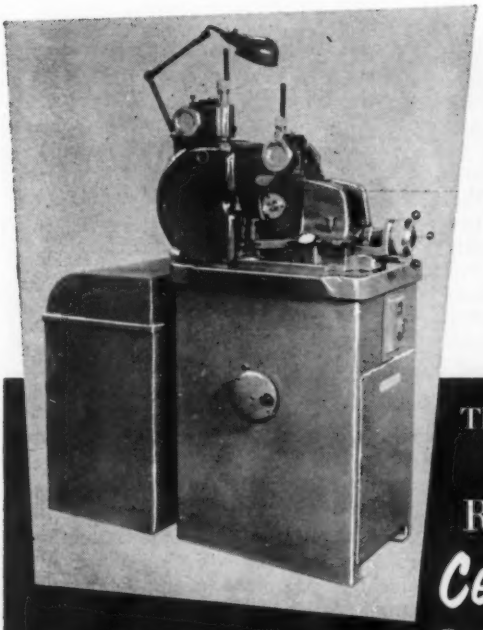
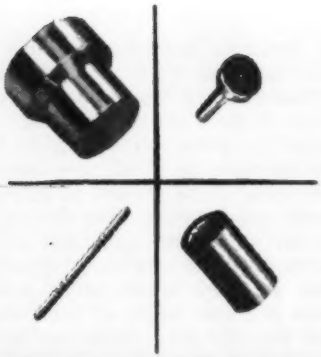
Circle No. 313 on Card, Opposite Page 65





The **LOW COST**
ROYAL MASTER
Centerless Grinder
grinds parts from **3/64" to 1-1/2"**

Tolerances of .0002" are readily held.
6-8 microfinishes are easily obtained.

Get all the facts

Write today for our 6 page descriptive brochure, illustrating and describing in detail the Royal Master Centerless Grinder, and showing examples of its work. No obligation.

To grind parts up to 1½" in size, you no longer need buy an expensive, bulky machine.

You can grind any part from 3/64" to 1½" on the low cost Royal Master Centerless Grinder, quickly and easily. You can turn odd sized dowels, drill rod, knock out pins, locating pins, bushings, shouldered pins, etc.

Using the low cost Royal Master for shapes up to 1½" means lower capital investment; lower depreciation, maintenance and other overhead costs.

ROYAL MASTER INC.
220 State Highway 23, Riverdale, N.J.

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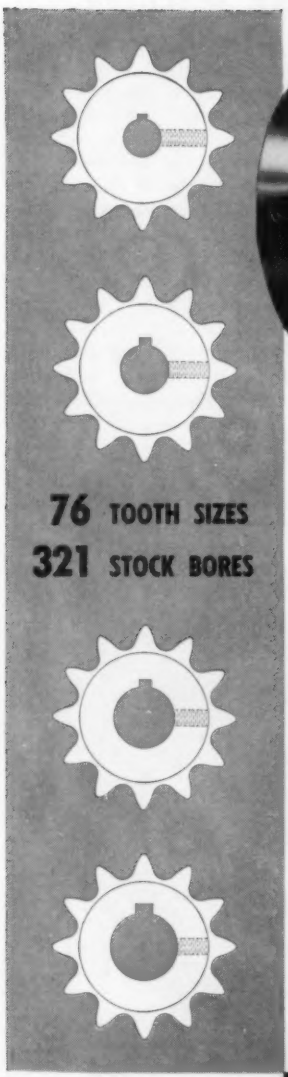

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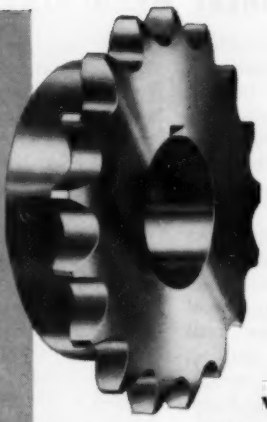
321 STOCK BORES



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STANDARD STOCK

BORED-TO-SIZE SPROCKETS

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FINISH BORED—READY TO INSTALL. Single width steel sprockets 3/8" Pitch through 1" Pitch — in 76 commonly used Tooth Sizes—with a full selection of finished bore diameters for each sprocket.

YOU SAVE EXPENSE of reboring, keyway cutting, drilling and tapping for setscrew . . . and you get BOSTON GEAR quality, the top standard for precision and performance.

OFF-THE-SHELF DELIVERY from your nearby BOSTON GEAR Distributor. Consult his factory-trained specialist for complete information on Sprockets for any drive. Ask for Catalog 56. Boston Gear Works, 81 Hayward St., Quincy, Mass.

7124
TRANSMISSION PRODUCTS
FROM LOCAL STOCK —AT FACTORY PRICES

Call your **BOSTON** Gear **DISTRIBUTOR**

Circle No. 315 on Card, Opposite Page 65

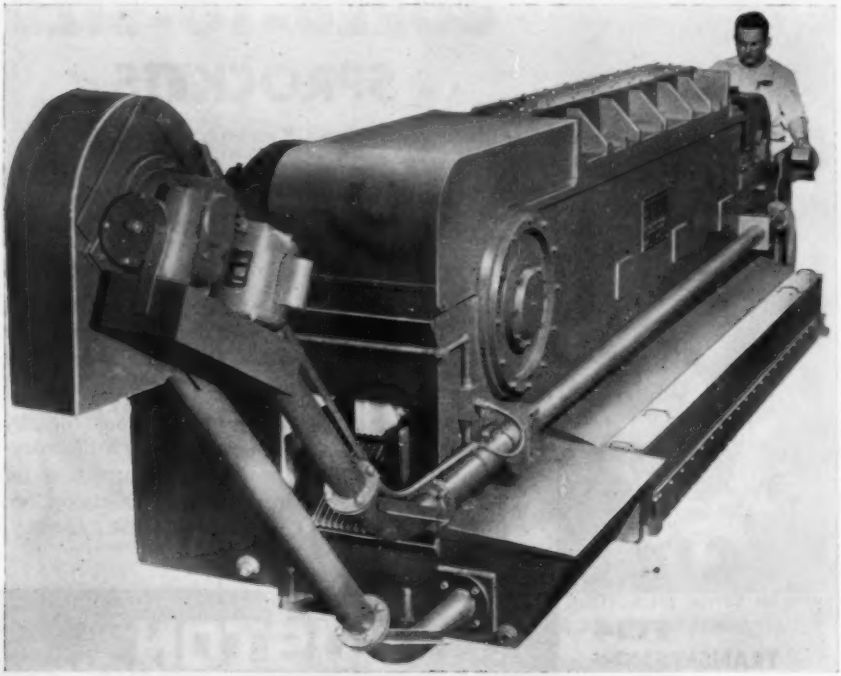
Continuous Horizontal Broaching Machine

A heavy duty horizontal continuous broaching machine has been announced by Detroit Broach Co., Dept. JS, 950 S. Rochester Rd., Rochester, Mich. Fixture locking, operation and unloading of the machine are fully automatic, while loading can also be done automatically when required.

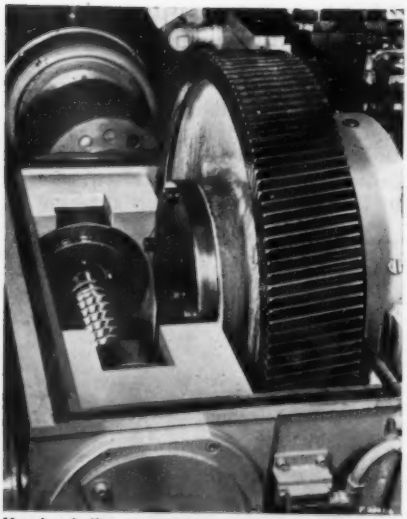
Longer broach life and very fine finishes are made possible because of the rigid construction of the machine. The frame is of all-welded, heavy steel plate construction. An oversize bull gear provides the positive pulling power, extra weight and smooth operation required for fine finishes. Easy, safe loading and unloading of a wide variety of work sizes and shapes is made possible by the extra fixture clearance formed by the large radius from the chain axis to the outer machine frame. A safety interlock device prevents operation until parts are positively positioned in the fixtures.

Cutting speeds up to 40 fpm can be obtained from the twin chain electric-mechanical drive. Other speeds can be obtained through change gears. Fixtures are the hammer lock type, automatically located, locked, opened and emptied. The number of fixtures can be varied to meet production requirements.

The machine is entirely self-contained, including the filtered coolant tank, pumps and automatic chip disposal unit, which is an endless con-



View of machine from unloading end. Unloading is done automatically by gravity, after automatic hammer lock releases fixtures.



Massive bull gear provides positive pulling power and smooth operation required for extremely fine finishes. This gear, directly connected to main drive drum, weighs more than 950 pounds.

veyor. Model illustrated has 90" stroke with 15 ton capacity, and is approximately 60" high by 70" wide by 207" long, plus chip conveyor overhang. Other 15 ton models are being built with 66" stroke and 120" stroke, while lower and higher tonnage capacities are also available.

Use ACTION Card, opposite page 64. Circle No. 86

Dial bore gage has range of ¼" to 5"

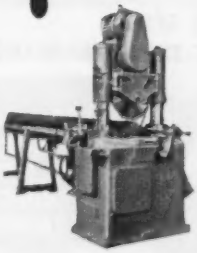
Rimat Gage Company, Dept. KE, 21 W. Dayton St., Pasadena, Calif., has announced its Thousand Series dial bore gage, providing one basic gage covering a range from ¼" to over 5". Interchangeable tips are used for checking bores, shallow counterbores, grooves, threads, reliefs, splines, and gears.

The basic gages are a pistol-grip design. They provide .0001" dial indicator readings with instantaneous cen-

Ohler

HYDRAULIC COLD SAWING MACHINES

VERTICAL, RIGID, HIGH SPEED TYPE.



AVAILABLE IN THREE SIZES TO 15¾" CAP.

AUTOMATIC OR SEMI-AUTOMATIC COMPARISON WILL CONVINCE YOU OF THE OUTSTANDING AND SUPERIOR PERFORMANCE OF OHLER EQUIPMENT

EXCLUSIVE FACTORY AGENT

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519 E. Jefferson Ave. Detroit 26, Mich.

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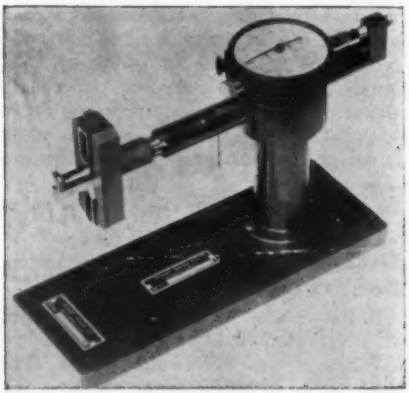
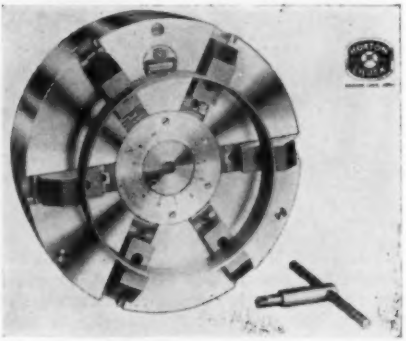


tralization and limited or no rocking. Micrometers, gage blocks, or rings may be used for master settings. Retractable tips have a straight-line expansion of .260" or .400" at any of the infinite number of settings.

Use ACTION Card, opposite page 64. Circle No. 87

Light-weight universal chuck has controlled centering pressure

The Horton light-weight universal chuck with its adjustable centering feature operates rapidly and accurately to center the workpiece without danger of distortion due to overtightening by



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spring loaded live center

FASTER SPEEDS
AUTOMATIC THRUST ADJUSTMENT

Smaller turning radius gives much higher RPM rate than ordinary live centers.

Spring loaded spindle gives automatic tail stock adjustment.

LESS OVERHANG MEANS MORE RIGIDITY. . MORE WORKING RANGE

GREATER LOAD CAPACITY
LONGER LIFE
JAM PROOF

Write today for complete information

Pat No. 2,520,473

CONCENTRIC TOOL CORP 2486 Huntington Drive, San Marino, Calif

Circle No. 317 on Card, Opposite Page 65

the operator. This is accomplished by setting the holding pressure desired on a calibrated plate in the center of the chuck; the six universal jaws are then brought into the piece simultaneously until contact is made and the preset pressure is reached.

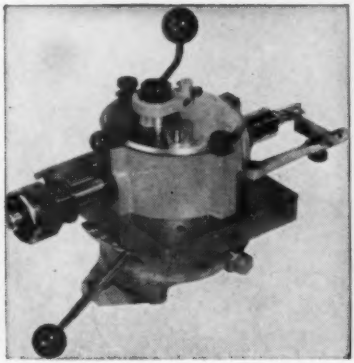
Upon arrival at this point, the jaws stop automatically, due to a slip-clutch arrangement, and hold the piece at the required pressure until released. This action eliminates the danger of distortion to small diameter thin-walled rings, weldments and other fragile parts subject to distortion by overchucking.

These chucks are manufactured in diameters of 12, 15, 18, 21 and 24 inches suitable for any type of spindle mounting and are available in 3, 4, 6 and 8 jaw styles. Top jaws can be supplied in any style to meet specific requirements. Horton Chuck, Dept. DR, Windsor Locks, Conn.

Use ACTION Card, opposite page 64. Circle No. 88

Grinding head has universal motion, any direction

The Multi-Spiral universal grinding head, for use with cutter grinders, surface grinders, milling machines, is said to eliminate elaborate setups and simplify difficult grinding jobs. Has a universal motion in an infinite number of directions. The spindle motion is adjustable straight in and out on a straight line with the center line of the spindle. While in this motion the spindle can be set to any spiral lead, right or left hand.



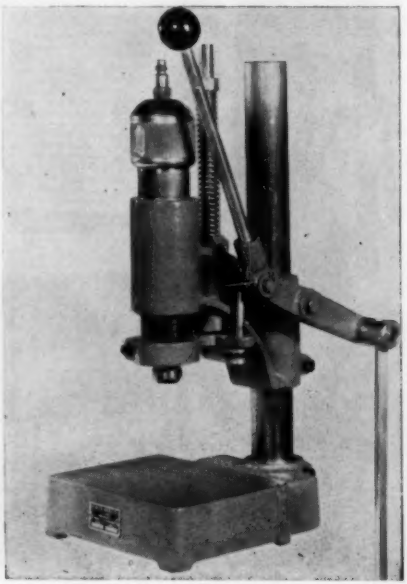
Also, with the spindle moving in and out, the head can be set to move at right angles to the spindle motion, which makes it possible to grind tapers. The head motion can be used independently or simultaneously with the other.

The unit is recommended for grinding form relief, back-off work, straight or spiral flute-grinding. Can be used for complete sharpening of almost any type of cutting tool. Available with or without base. Spiral Step Tool Co., Dept. RB, 5404 N. Damen Ave., Chicago 25, Ill.

Use ACTION Card, opposite page 64. Circle No. 89

Repeating air hammer

Model 150-RH air operated impact machine is a high speed repeating or vibrating hammer, using a comparatively small (1" diameter) hammer-pellet at constant stroke, with variable air pressure. Contact of the tool with the



work opens the hammer valve, and so long as pressure is maintained by the foot pedal the hammer shuttles up and down at a frequency of 6500 cycles per minute. Heidrich-Nourse Co., Dept. KE, 631 E. Third St., Los Angeles, Calif.

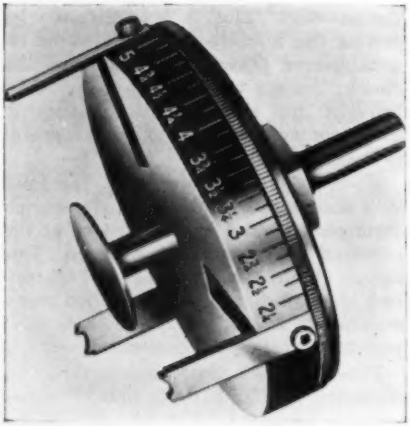
Use ACTION Card, opposite page 64. Circle No. 90

Hole Cutter

This adjustable hole cutter will cut holes of various sizes in steel, brass, plastic, wood and other materials.

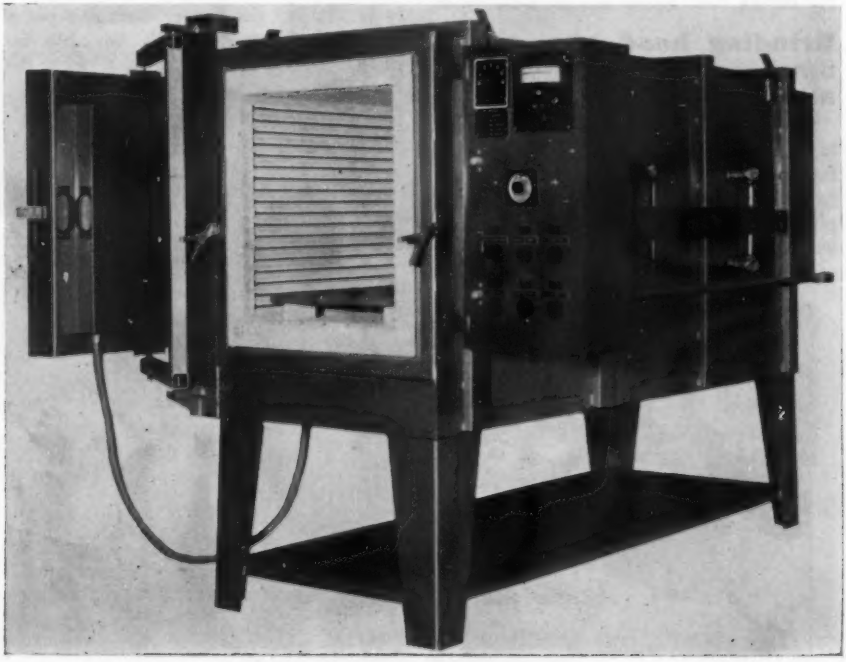
The holes can be made from 2¼" in diameter to 5". You dial to the size desired. Erwood Inc., Dept. RB, 1770 W. Berteau Ave., Chicago 13, Ill.

Use ACTION Card, opposite page 64. Circle No. 91



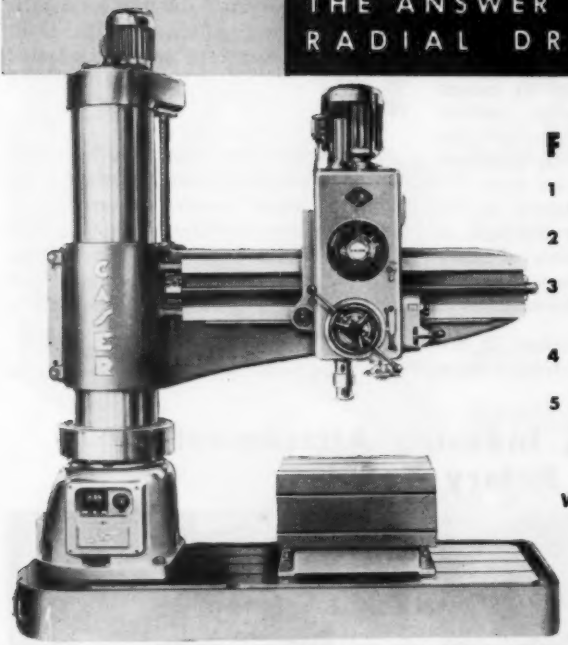
Heat Treating Furnace

The L & L Mfg. Co., 136 8th St., Upland, Chester 68, Penn., has announced a furnace designed for critical temperature heat treating operations



new CASER

THE ANSWER TO ALL YOUR RADIAL DRILL NEEDS



FEATURES

1. Single push button clamping of column and head.
2. Single control for power arm elevation.
3. Single control starts, stops and reverses spindle with pre-selection of all speeds while machine is running.
4. Speed dial permits speed and feed selection while machine operates.
5. Single knob feed dial can be operated while machine is running and feed is engaged.

Write, wire or telephone for descriptive literature

DISTRIBUTORS IN PRINCIPAL CITIES

CASER RADIAL DRILLS ARE AVAILABLE IN THE FOLLOWING SIZES:

ARM LENGTHS	2'6"	3'	4'	4'	5'	6'	7'	8'
COLUMN DIAMETER	8"	10"	12"	14"	16"	17"	22"	22"

MASERATI CORPORATION OF AMERICA
Westbury Long Island N.Y.

MASERATI

CASER RADIAL DRILLS

Caser radial drills range in size from the Fr-11, with a 2'6" arm and 8" column diameter, to the FR-9 with an 8' arm and 22" column diameter: 8 to 24 spindle speeds: 3 to 8 feeds; spindle travel 8" to 18"; Maximum distance spindle nose to top of base, 46" to 73"; Vertical travel of arm on column 23 3/16" to 34"; head travel on arm 23" to 80", capacity in steel 1" to 3 1/16", in cast iron 1 3/8" to 3 3/16"; Morse taper 3, 4 and 5; working surface of base 38" x 27" to 106" x 47"; net weight 2,430 lbs. to 24,000 lbs.

Circle No. 318 on Card, Opposite Page 65

such as annealing intricate assemblies of laboratory glass, production heat-treating metal, where furnace gradients must be controlled closely.

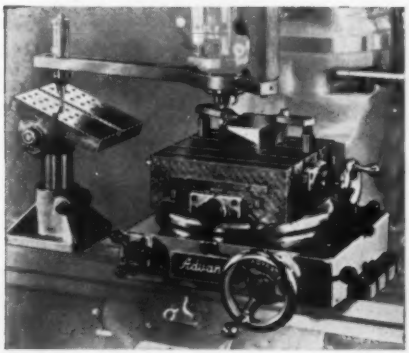
Interior dimensions of furnace are 24" wide x 24" high from hearth to roof and 72" long. Different temperatures in different parts of the furnace are controlled and indicated by means of the thermocouple selector switch. There are six zones in the furnace, the input to each is controlled by an input controller which may be set from 7% to 100% of input in increments of 1%, giving precise control over the rate of heating in that zone. Any rate of heating up time may be selected, enabling control over product uniformity.

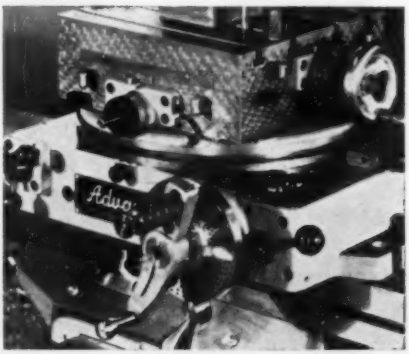
Completely automatic control is attained by a combination of temperature controller with straight line adjustments and a precise thirty hour timer. The temperature controller upon its first impulse at the control point starts the timer on its timing-out cycle. When the timer has timed out the furnace is automatically shut off. At this point variable cooling off may be selected by setting the controller to the desired rate.

The elements are supported by means of Dyna-Glow element holders having excellent heat transfer properties. A low mass characteristic keeps overshoot and undershoot of the temperature control point due to minimum heat storage in the element holders to a minimum.

Use ACTION Card, opposite page 64, Circle No. 92

Profiling Table, Indexing Attachment for Cross-Slide Rotary Table



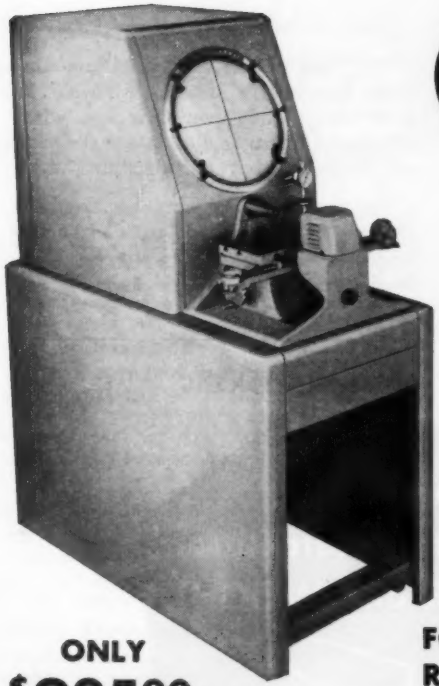


Morrison Engineering Co., Dept. MM, 941 W. Lake St., Chicago 7, Ill., have announced two accessories for their Advance cross-slide rotary table, extending its usefulness.

The universal profiling table has a top table surface of 8"x8¼". Maximum angle from horizontal plane is -75 in one direction and -95 in opposite direction with 360 swivel. Minimum height from face is 9". Maximum height from face is 11½".

The indexing attachment is supplied with 1538 and 22-49 dividing Plates.

Use ACTION Card, opposite page 64, Circle No. 93



COVEL *Optical* COMPARATOR

New, low-priced contour projector for quick, economical precision inspection

FOR ACCURATE CHECKING RIGHT IN THE SHOP

ONLY $985.00

Large work capacity, sturdy, precision construction and optic arrangement which permits use in bright light in the shop. Ideal for shops using mechanical measuring methods because they haven't been able to afford the luxury of an optical comparator.

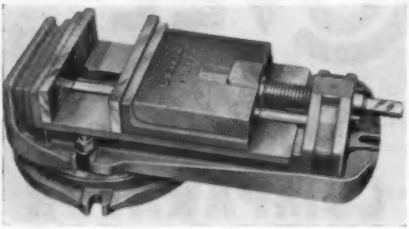
SEND TODAY FOR DESCRIPTIVE BULLETIN B-76

COVEL MANUFACTURING COMPANY

BENTON HARBOR, MICHIGAN

Circle No. 319 on Card, Opposite Page 65

Milling machine vise



The jaws of the Mogul milling machine vise are ⅝" thick, 8⅝" wide, 2-3/16" deep and open 6 inches when in place. There is full length bearing on the ground bar and machined ways.

The work holding surfaces are held at true right angles or parallel to the table. L-W Chuck Co., Dept. JS, 80 S. St. Clair St., Toledo 4, O.

Use ACTION Card, opposite page 64. Circle No. 94

CASE HISTORY OF A SHORT-RUN PLASTIC

Nylon Pulley Saves Sailboat Manufacturer MONEY, WEAR and WEIGHT

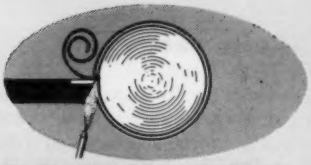
Converting from a metal machined casting to a Nylon pulley enabled a maker of sailboats to eliminate scratching and nicking of the canvas top and lacquered wood surfaces of his boats. The self-lubricating Nylon pulley eliminated the oilite bearing-type metal pulley and saved overall pulley weight as well. Cost-wise, the customer can now buy, in thousand lots, two different size pulleys, molds included, for less than 1,000 each of the old metal pulley. Additional orders will be even less.

Plastic parts can save dollars and improve product usage. Consider short-run molded plastics for your product. Send a blueprint or sample for prompt quotation.

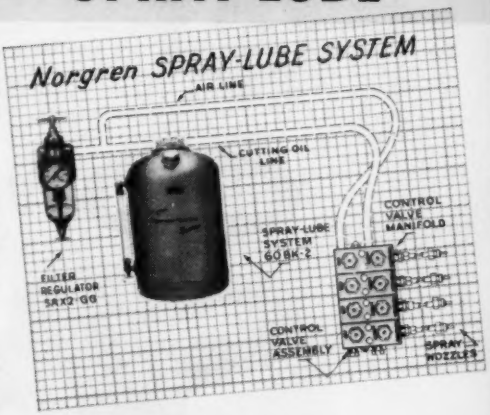
DAYTON ROGERS
Manufacturing Company
MINNEAPOLIS 7C, MINNESOTA

Circle No. 320 on Card, Opposite Page 65

Faster Metal Cutting at LOWER COST with Improved Norgren SPRAY-LUBE



for Tapping Machines • Drill Presses • Drilling Machines • Grinders • Lathes • Boring Machines • High-Speed Saws • Stamping Presses • Deep Draw Presses • Other Metal Working Equipment



Better Lubrication

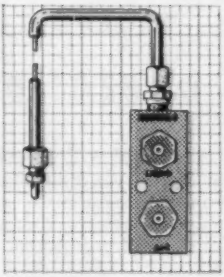
A uniform spray of cutting oil is applied directly upon the close interface between the tool and work piece from any angle that best reaches the lubrication point. Tool wear is less—saves tool costs, cuts down-time.

Faster Cooling

Because of the larger fluid surface area of the spray and the expansion of the compressed air, heat is dissipated quicker. Cutting can faster—production stepped up.

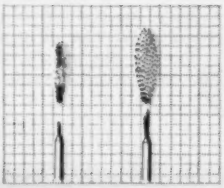
Uniform Spray

Air and cutting oil are conveyed to nozzle by means of a tube within a tube connection. The spray produced by the nozzle is consistently uniform in quality and is delivered to the cutting area the instant the machine starts. There is no sputtering or intermittent flow.



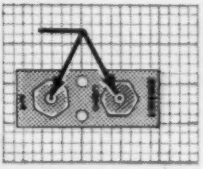
Accurate Control of Spray

By adjusting the pressure and the individual outlet controls for air and coolant, spray can be applied in exactly the right quality and quantity for any metal cutting or metal forming job.



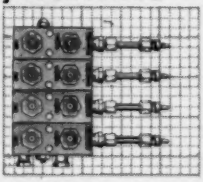
Tamper-Proof Controls

Flow of both air and liquid are adjusted through Allen-head screws recessed into control valves, preventing tampering with flow.



Valves Compactly Manifolded

For multi-point application of SPRAY - LUBE, the control valves are designed to be closely assembled in a manifold arrangement.



Compact, Convenient Size

A 2-gallon unit fits a space only 14"x20"x7"—only 4 to 12 fluid ounces per hour per nozzle are sufficient for most operations.

C.A. Norgren CO.

3438 So. Elati St., Englewood, Colo.

Without obligation, learn how improved Norgren SPRAY-LUBE can reduce costs in your plant. Call your nearby Norgren Representative listed in your telephone directory—or **WRITE THE FACTORY FOR BULLETIN 537.**

Pioneer and Leader in Oil-Fog Lubrication Since 1930

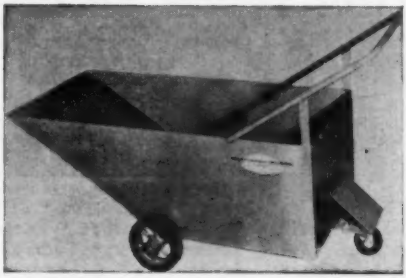
Chip cart

The Model 47 chip cart is designed especially for use with machine tools which have low bed clearance. Handles parts, chips, shavings, or refuse as well as liquids.

Cart body is mounted on two eight inch roller bearing wheels and one four inch swivel caster. Either solid steel or rubber tired wheels are available.

Coolant Equipment Corp., Dept. RB, Verona Ave., Verona, Wis.

Use ACTION Card, opposite page 64. Circle No. 85

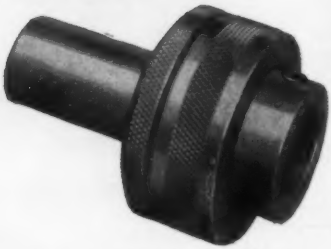


GREEN *full floating*

REAMER HOLDER

maintains absolute concentricity

in reaming operations!



• **Corrects for misalignment** • **Prolongs tool-life**

The Green Reamer Holder will automatically compensate for any misalignment of the reamer and the drilled hole. The unique design allows the reamer to float in any direction. No need for periodic checking; as once the float adjustment is set it will not change. Shock on the cutting edges and any tendency to chatter is fully absorbed. No loss of grinding centers as the hollow shank permits whole reamer to be set in as far as necessary. Available with standard or tapered shank.

Write for complete details and prices.

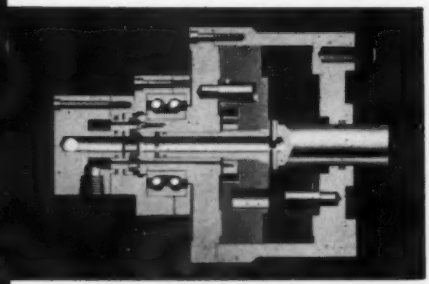
GREEN MANUFACTURING CO.

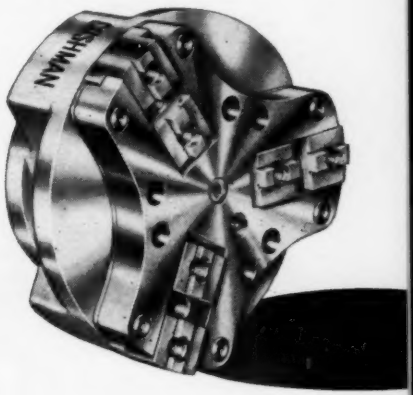
122 S. PRAIRIE AVE. • ROCKTON, ILLINOIS

Circle No. 322 on Card, Opposite Page 65

CUSHMAN chucks give Chuck-ability

CHUCK-ABILITY: The ability to SPEED your work . . . ELIMINATE fatigue . . . IMPROVE your products . . . and REDUCE your costs . . .through design and selection of the right work-holding devices.





Typical Cushman Air Operated Chucks and Cylinders for repetitive machining operations permitting increased production at lower costs.

the key to machining efficiency

Today's repetitive manufacturing demands *efficient* and *economical* operation of high speed machine tools. Cushman Air Operated Chucks and Cylinders give you **Chuck-ability** with satisfactory performance under the punishment of constant day-in and day-out service . . . no loss of chuck or cylinder efficiency over a long service life . . . no air leakage problems . . . and the feature of *quick* loading and unloading of workpieces at the touch of foot or hand.

Chuck-ability is available to you in Cushman's complete line of manually and air operated precision chucks, designed and manufactured to meet today's high metal working quotas at lower production costs.

Write today for catalogs fully describing Cushman Chucks. Or, should you have a particular work-holding problem, Cushman can give you **Chuck-ability** in a special chuck, designed and engineered to your requirements.

CUSHMAN CHUCKS . . .
a Product of American Quality, Labor and Materials.

THE CUSHMAN CHUCK COMPANY • Hartford 2, Connecticut
a world standard for precision

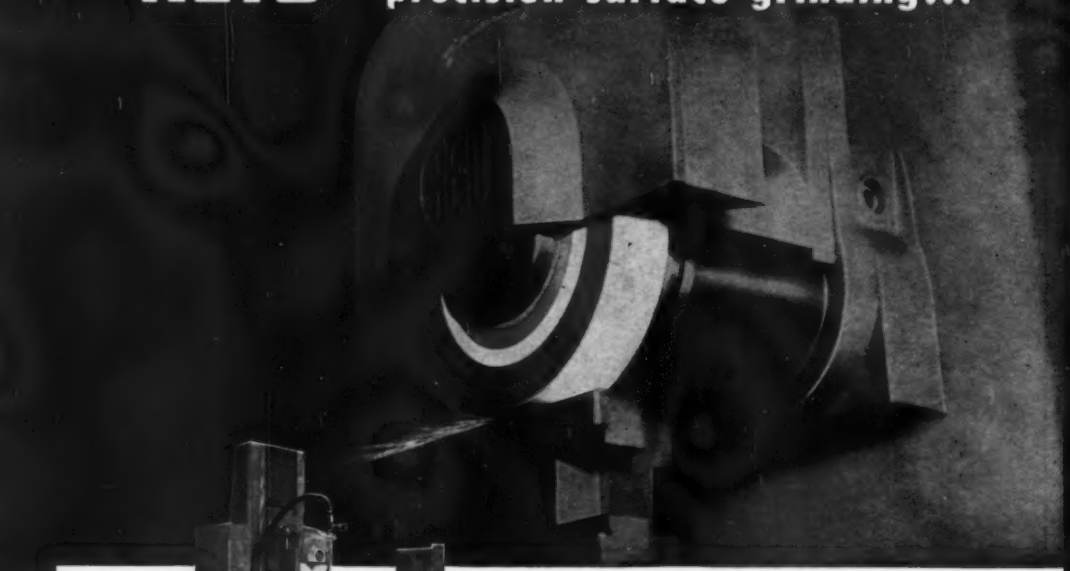
CUSHMAN CHUCKMAN CHUCKS

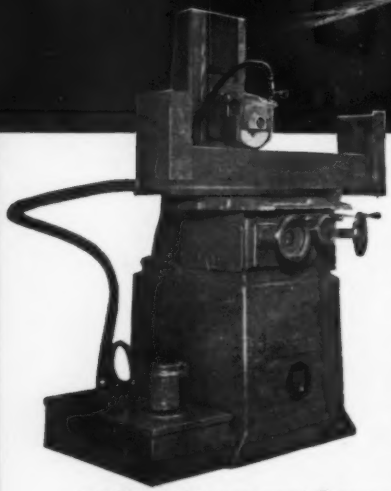
SEE YOUR INDUSTRIAL DISTRIBUTOR

manufacturers of:

Air Operated Chucks, Cylinders, and Accessory Equipment . . . The Cushman Power Wrench . . . Cushman Manually Operated Chucks and Face Plate Jaws.

REID sets the standard for precision surface grinding...

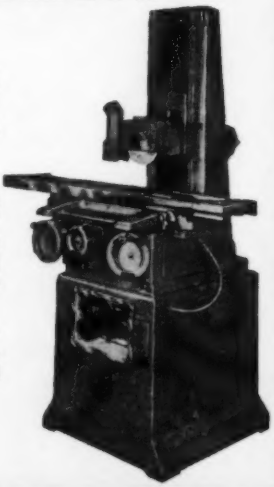




MODEL 618H convenient finger-tip level controls for all operations make this grinder the favorite of the toolroom for the finest tool and die grinding. Accessories, including Cool-Grind or wet grinding attachments, magnetic chucks and form dressers give extreme versatility for all operations.

MODEL 618VL designed for precision grinding to the finest tolerances with superior surface finish . . . rugged construction and painstaking finishing give true dependability for continuous operation with minimum maintenance. Features power feed table with traverse speed variable from 12 to 35 feet per minute.

Photo courtesy of Robertson Mfg. Co.



SPECIFICATIONS

CAPACITY: 6" wide, 18" long, 17¼" high from spindle center to table.

WORKTABLE: 51" x 8" overall.

FEED RANGE: Elevating hand wheel (r.) graduated to .0005" (optional, vernier to .0001"); cross feed to .001"; power cross feed adjustable .006" to .100" at either or both ends of table reverse.

GRINDING HEAD: with 3" opening for standard 1 h.p. cartridge type motorized spindle. Wheel size: 7" x ½" x 1¼".

FLOOR SPACE: 71" x 43½".

WEIGHT: 2100 lbs. net.

Write for Bulletin 618-6

Reid Brothers Company, Inc.

BEVERLY, MASSACHUSETTS

When one welder gives both AC and DC...

Handles every type of electrode...

Yet costs less to buy and operate...

WHY

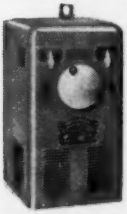
shouldn't you be using IDEALARCS for your production welding?

Certain electrodes work best on... AC

Other electrodes operate better on... DC

Some rods that work best on DC in smaller sizes... DC

work best on AC on the larger sizes. AC



IDEALARC

with its instant selection of AC or DC gives optimum performance *on every type and size electrode.*

There's no other welder like Idealarc.

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

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Dept. 3609, Cleveland 17, Ohio

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☐ Have representative call.

Name_____

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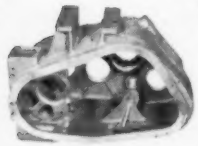
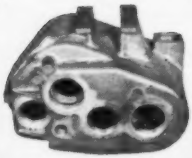
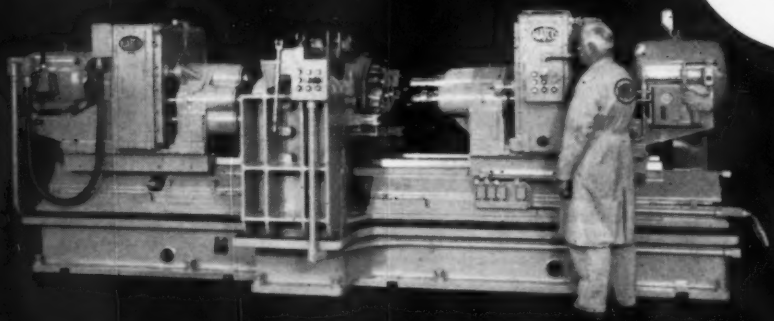
Natco® Automatic Matches Boring Mill Accuracy

and quickly converts for five different jobs







This Natco two-way machine stepped in where automatics "fear to tread!" It replaced a precision boring mill, speeded production and didn't give up a tenth in accuracy! At The Frank G. Hough Co. boring mills were used for exacting tolerances on transmission parts for the Hough Payloader®. Higher production was desired.

Now with a Natco two-way automatic, Hough is getting production rates—not job shop rates. The Natco bores diameters to within .0005"—square with mounting face within .0005" per inch bore length. The machine also chamfers, counterbores and notches boss contours.

Versatile too! Hough processes five different transmission housings or covers with a single machine. After a typical production run averaging 100 parts, the machine is quickly converted to another job.

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

National Automatic Tool Company, Inc.

Richmond, Indiana

Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.

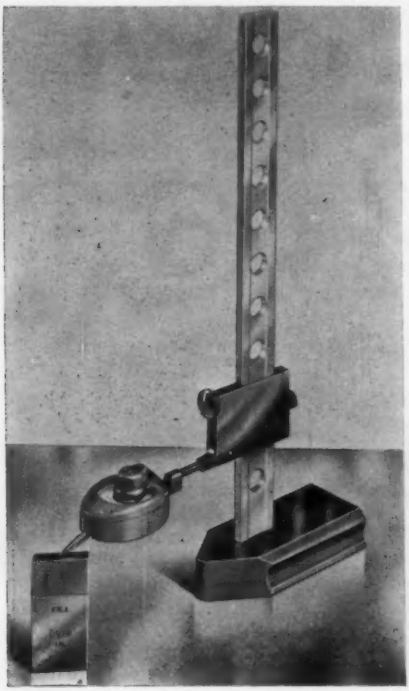
NATCO

Micro indicator solves difficult measuring jobs

The Minikator No. 590 is a micro-indicator especially designed for transferring dimensions and measuring in otherwise inaccessible places. It is particularly suitable for indicating out-of-roundness or concentricity of grinding machine spindles and for locating drilling jigs.

The amplification device is purely mechanical and without friction and slackness. Measuring points of two different lengths 1/16" dia. are supplied with every instrument. One point provides a measurement range of .003" with .00005" dial graduations and the other provides a range of .006" with .0001" dial graduations.

A height gage for use with the Minikator comparator is made of tool steel,



HOW

VIMCO *Lights*

instant adjustability saves you money!

Note how easily Vimcolights can be moved to any position in the picture above. On your machine this means the operator can instantly adjust the Vimcolight to meet the needs of his work. There's no screw or bolts to loosen, then reset . . . Vimcolight's rigid steel wrapped flexible arm and wide range lamp swivel are ready to move instantly . . . yet stay firmly in place when set. The operator has soft, comfortable light that helps him work better . . . more efficiently . . . all shift long.

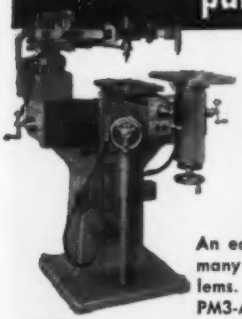
Send for "Bulletin 85"
or "OEM Bulletin"

VIMCOLIGHTS Are UL Listed

VIMCO MFG. CO., INC.
Since 1919
109 Brayton St. Buffalo, N. Y.

Circle No. 323 on Card, Opposite Page 65

3-Dimensional panto-miller



Accurate pantographic milling on either flat or curved surfaces.

New
CAPACITY
SENSITIVITY
ACCURACY
CONTROL

An economical answer to many production problems. Send for Bulletin PM3-A.

2-Dimensional panto-miller

Versatile and dependable for continuous service, the J&B "Panto-Miller" 2A:

ENGRAVES
PROFILES
DIE CUTS
MILLS

Write for Bulletin PM2-A.

3-WAY Indexing Trunnion

Simple, Rapid, Positive positioning of workpiece or jig for all angle Drilling, Tapping, or Counterboring. Available with Chuck, Faceplate, or Right-Angle Adaptor Plate. Complete with Station Selector. For details, ask for Bulletin IT3-A.

J&B
EST. 1870
JOHNSON & BASSETT INC.
PRODUCTION TOOL DIVISION
WORCESTER, MASSACHUSETTS

Circle No. 324 on Card, Opposite Page 65

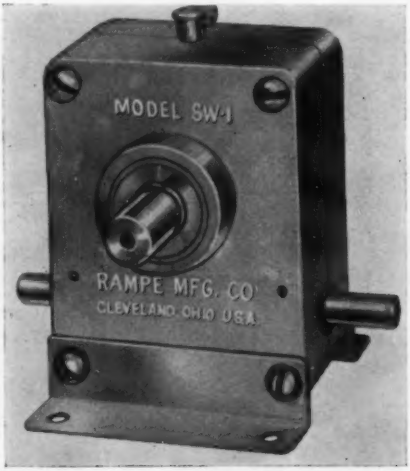
hardened and ground. The base is lapped and contacts the surface plate at the outer edges and relieved in the center, thereby eliminating most vibration as the gage is moved over a flat surface.

The sliding member contains a fine adjustment knob for settings of .000025". C. E. Johansson Gage Co., Dept. JS, 10641 Haggerty, Dearborn 1, Mich.

Use ACTION Card, opposite page 64, Circle No. 96

Speed reduction unit

The Model SW-1 gear reduction unit for use with fractional horsepower motors, has a case molded from polyester fibre glass and gear made of nylon. The worm is of steel. It is available in seven sizes with speed reductions ranging from 5¼ to 1 to 60 to 1.



Shafts are furnished in two styles—solid and hollow. The hollow has the advantage of being mounted as an integral part of the product with which it is used. The cases are available with or without mounting feet. Rampe Mfg. Co., Dept. RH, 14915 Woodworth Ave., Cleveland, O.

Use ACTION Card, opposite page 64, Circle No. 97

MILLING MACHINE ARBORS, ADAPTERS, ARBOR SPACERS AND BEARINGS

Hardened and ground to high standards of accuracy and quality.

These products are built by long established, reputable West German manufacturers, and tested for performance to American standards. Immediate delivery from New York City stock at low competitive prices.

Also available:

- ***Multi purpose vises***
- ***Tapping attachments***
- ***Lathe mandrels***
- ***"Wille-Grip" keyless drill chucks***
- ***Large variety of machine tools***

MBI

QUICK CHANGE CHUCKS & COLLETS

All parts hardened and ground. Simplicity of construction insures trouble-free operation.

Our headquarters in New York City

Write for complete details and prices to Dept. 303

M.B.I. EXPORT & IMPORT LTD.

A Division of Machinery Builders Inc.

475 Grand Concourse, Bronx 51, N. Y.

"Over 20 years experience in designing and building machinery"

CABLE ADDRESS: Machbuild New York

Phone: MOtt Haven 5-0900

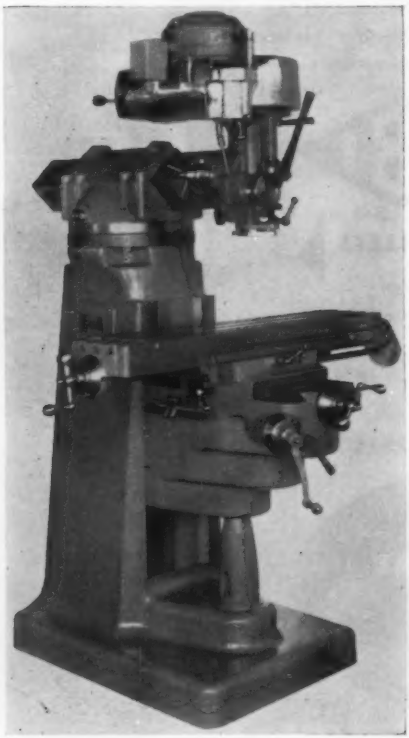
Circle No. 325 on Card, Opposite Page 65

Mill's sliding overarm has square design

The "45" overarm vertical milling machine is designed to do milling, drilling and boring with accuracy, speed and economy.

Square design of sliding overarm gives more rigidity. It provides extra range and capacity—more usable working space—more versatility in setup—more power at the cutter. No adjustment required on overarm and head after use and no need to re-indicate head after moving overarm. Speed range with nine changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Extra weight, strong ribbed column, knee saddle and table contribute to the rigidity and power of the machine. Index Machine Co., Dept. JS, 543 N. Mechanic St., Jackson, Mich.

Use ACTION Card, opposite page 64. Circle No. 98



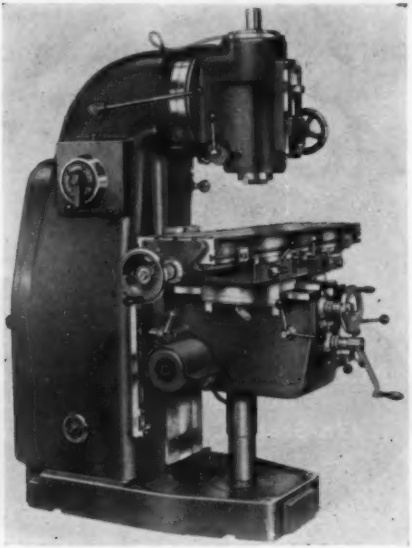
Vertical milling machine

The Swedish-made No. 2 Sajo vertical milling machine Model VF-54, is a standard duty high speed type, having power longitudinal, transverse and vertical feeds and power rapid traverse in all directions.

All sliding surfaces are hand-scraped. Table working surface is 47¼" x 11". Longitudinal power feed is 33½". Transverse and vertical travel, either by hand or power, are respectively 12" and 18".

Power is transmitted to the spindle via a gear train from 7½ hp motor mounted in the base of the column. 12 spindle speeds—selected by direct reading dial and single crank—are available in range from 39 to 1500 rpm. Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N.Y.

Use ACTION Card, opposite page 64. Circle No. 99



Speed-up

YOUR CHECKING AND STRAIGHTENING JOBS!

Anderson

HYDRAULIC

POWER

PRESS

PRESSES OF 10-25-50 TON CAPACITY

Built with stationary or traveling ram . . . so sensitive a shaft may be straightened to within .001". Straightens and checks in the same position. Flexible, accurate control valve operated by a hand lever. Manufacturers with straightening, checking, and truing operations that require speed and accuracy find Anderson Power Presses to be the answer to their problems.

Anderson

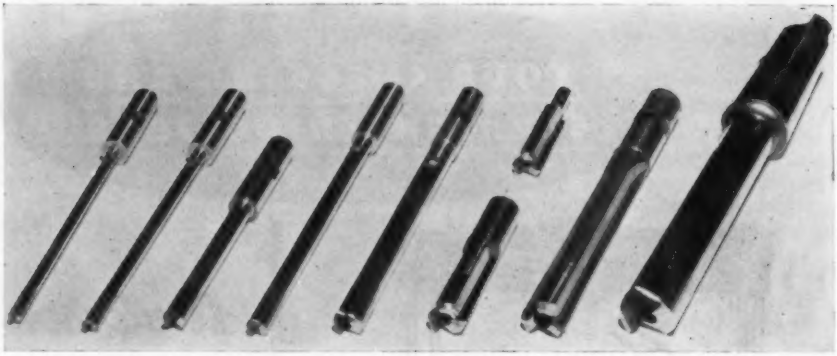
Write for Bulletin No. 7-6.

ANDERSON BROS. MFG. CO.

ROCKFORD, ILLINOIS

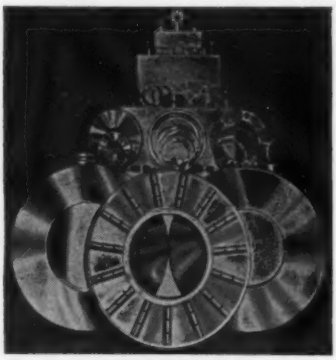
Circle No. 326 on Card, Opposite Page 65

Carbide-Tipped Drill



This carbide-tipped Starbore drill produces smooth, precision through-holes from the solid at feeds up to 60" per min. in cast iron, aluminum, bronze and steel parts. Hole tolerances of 0.0002" and surface finishes as smooth as 4 rms can be produced by the tool at feeds of 15" per minute.

Drill has a hollow circular molded carbide tip brazed to a tubular steel shank. Coolant directed under pressure to the cutting edges through the drill flushes out chips through flutes along the shank. The hole through the drill is off-center to permit one of the two or more balanced carbide cutting



All kinds of
BALL & ROLLER THRUST BEARINGS
Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.
Immediate delivery on most bearings.
ACORN BEARING COMPANY
(Established 1917)
68 Stanley Street New Britain, Conn.

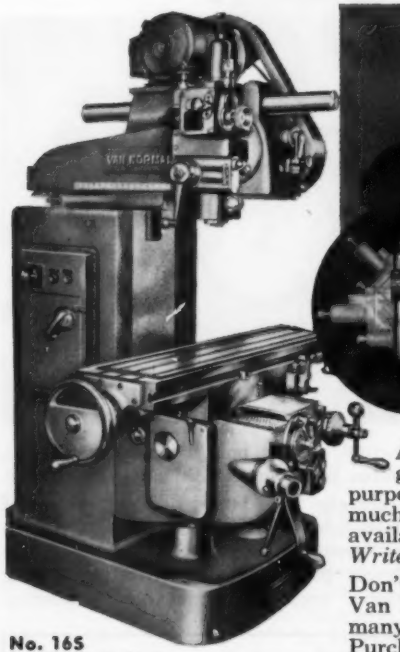
Circle No. 327 on Card, Opposite Page 65

Circle No. 328 on Card, Opposite Page 65

NEW VAN NORMAN NO. 16S RAM TYPE MILLER

with the Quill-Type Adjustable Cutterhead

Gives you MORE VERSATILITY PLUS MORE CUTABILITY than Single Purpose Machines



Quill-Type Adjustable Cutterhead Mounted on Rugged Heavy Duty Ram Gives You Horizontal, Angular and Vertical Milling PLUS Accurate Boring and Drilling on ONE Machine.

No. 16S
Quill Travel: 4"
Quill Power Feed: .0015; .003; .006
22" Power feed to table
Cutterhead Spindle Motor: 2 HP

You can own this machine for as little as $4.98 per day

A single investment in this one miller gives you the equivalent of two single purpose machines plus attachments at the much lower cost of a single machine. It is available in both plain and universal models. *Write for complete details today.*

Don't wait . . . for extra profits install a Van Norman now! They are available on many purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate. See your dealer or write Van Norman Machine Company.

Lease and Conditional Sales Contracts not available to Export.

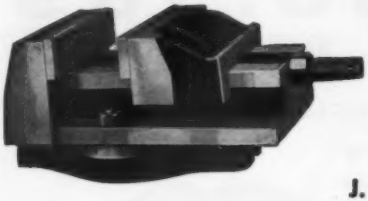
Write for complete details today.

VAN NORMAN MACHINE COMPANY | **SPRINGFIELD 7, MASSACHUSETTS**

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

Circle No. 329 on Card, Opposite Page 65

PLUNKET IMPROVED VISES We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked



In ordering this vise give size of slot in table:
No. 10—6" jaws, 1½" deep, opens 5"
wt. 45 lbs. ..... $ 90.00
No. 20—10" jaws, 2¼" deep, opens 9½"
wt. 120 lbs. $122.00

Best material and workmanship. Prices are net f. o. b. Chicago *Dealers' inquiries are solicited*

Write for folder TODAY

J. E. Plunket Machine Co. 3230-32 Archer Ave. Chicago 8, Ill.

Circle No. 330 on Card, Opposite Page 65

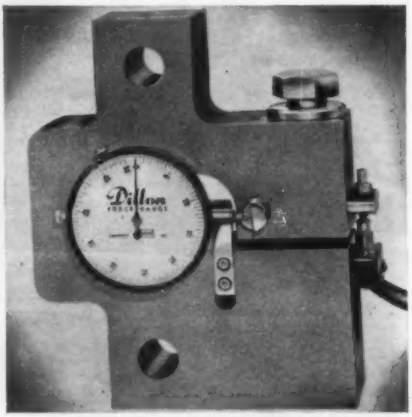
edges to produce a small pin during the cutting process, thus providing a tool with the combined advantages of an oil-flute drill and a trepanning tool. Star Cutter Co., Dept. JS, 34500 Grand River Ave., Farmington, Mich.

Use ACTION Card, opposite page 64. Circle No. 100

Force gage for 50,000 lb. tests

W. C. Dillon & Company, Dept. KE, 14620 Keswick St., Van Nuys, Calif., are now producing an 0-50,000 version of their force gage, suitable for a wide variety of testing applications hitherto impractical because of the high range required. Instrument is available for either compressive or tensile tests and has an accuracy of within 1% of the indicated reading.

Model pictured is the tensile version, with eyes for the insertion of clevises. Compression model has instead a recessed cup on top for seating a free-riding, hardened steel ball. Rotating



action of this ball under pressure insures true vertical thrust against gage.

Safety stop-bolt at upper right of tensile model prevents undue expansion of open end of gage. Bolt screws into lower portion of gage while allowing upper portion to ride free. Accidental

SPACE SAVERS

RACKS FOR ALL BAR STOCKS

Keep your bar stock within easy reach and conserve 75% of your storage space. Eliminate handling accidents. YOHE racks placed back to back increase storage efficiency. Stock always visible. Write for literature and prices today. . . .

THE YOHE SUPPLY CO.

P.O. Box 708 **Canton 1, Ohio**

Circle No. 331 on Card, Opposite Page 65

Quick brush off for burrs

MACHINING this extruded aluminum armature shaft for an aircraft generator turns up heavy burrs. However, Osborn's power brushing method quickly removes burrs and—at the same time—blends all sharp edges.

This is typical of how industry is using Osborn power brushing to improve and speed up thousands of finishing operations.

An **O**sborn **B**rushing **A**nalysis made in your plant will show how *you* can profit from Osborn power brush finishing. Write *The Osborn Manufacturing Company, Dept. L-21, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Circle No. 332 on Card, Opposite Page 65

Over 85% of the torque wrenches used in industry are

STURTEVANT
TORQUE WRENCHES
Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch grams
...inch ounces
...inch pounds
...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

P.A. STURTEVANT CO.
ADDISON (QUALITY) ILLINOIS

Circle No. 333 on Card, Opposite Page 65

New! SPINDLE BALANCING DEVICE

New! DEPTH GAUGE

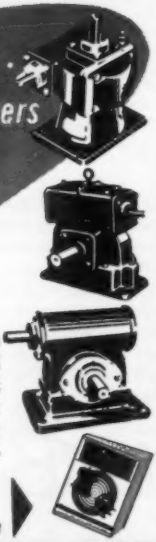
LASSY TAPPERS

New exclusive features and top quality make Lassy Tappers outstandingly the finest available, for the tool room—small lot production—and the problem jobs. A low priced investment that soon pays for itself.
Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL CO. Plainville, Conn.

Circle No. 334 on Card, Opposite Page 65

Abart ..... has over 75 answers to your speed reduction problems



There are over 75 types and sizes of Abart Speed Reducers you can select from stock. Ratings: 1/50 to 168 hp. Ratios: up to 10,000 to 1. Specials to order.

Write for Abart pocket-size catalog

ABART GEAR & MACHINE CO.
West 16th Street • Chicago 50, Illinois

Circle No. 335 on Card, Opposite Page 65

WHOOT MON!

You really get your money's worth when you buy precision screw machine products made by "you know W.H.O.*"

CAP SCREWS • COUPLING BOLTS
SET SCREWS • MILLED STUDS
. . . our specialty.

*Wm. H. Chandler Co.
YORK, PENNA.

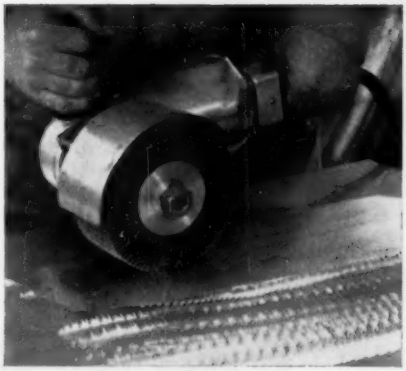
Circle No. 336 on Card, Opposite Page 65

over-loads beyond the gage's normal 25% safety factor merely cause the upper portion of the gage to come to a positive stop against the bolt head, thereby providing a safety factor in excess of rated capacity.

Use ACTION Card, opposite page 64. Circle No. 101

Wheels for metal polishing

Small "PG" wheels — designed for polishing metal with portable hand tools—are composed of die-cut pieces of coated abrasive cloth, bonded with resin and locked into a hub. They are intended for rust or dirt removal, blending patterns left by disc sanders, weld polishing, featheredging for spot painting, and similar polishing operations. The coated abrasive cannot become filled, since the mineral grains and the backing wear away together, presenting an always-new surface to the work. Wheels are available in 6" to 10" diameters, with 1", 1½", 2" and



3" face widths, and in an 11" diameter in 2", 2½" and 3" face widths. The wheels are currently being made with aluminum oxide or silicon carbide mineral on a cloth backing, in grits ranging from 50 through 320. Minnesota Mining and Mfg. Co., Dept. RB, 900 Fauquier St., St. Paul 6, Minn.

Use ACTION Card, opposite page 64. Circle No. 102

ALL in ONE TOOLHEAD

BORING
FACING
TURNING
GROOVING
UNDER-CUTTING

SIX SIZES AVAILABLE

All Have Power Feed for Facing

Write today for complete details.

CHANDLER TOOL CO.
Muncie, Indiana

Model "D"

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

Circle No. 337 on Card, Opposite Page 65

Foreman of large precision tool grinding shop

"We save $7,000 yearly by using ESSEX carbide burrs instead of mounted points."

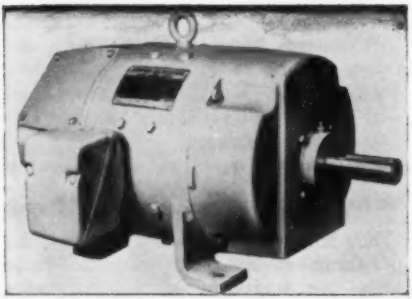
"We used to spend $20,000 yearly for mounted points. Today, we do the same work with hand ground, precision-made ESSEX carbide internal grinding burrs costing only $13,000 — a $7,000 saving!"

Find out how ESSEX carbide tools can help *you*. Write for *free*, 12-page illustrated catalog today.

ESSEX ROTARY FILE & TOOL CORP.
295 Madison Ave., N. Y. C. 17, M&TB-76
My name.....
Company.....
Address.....
City..... Zone..... State.....

Circle No. 338 on Card, Opposite Page 65

New line of motors and generators



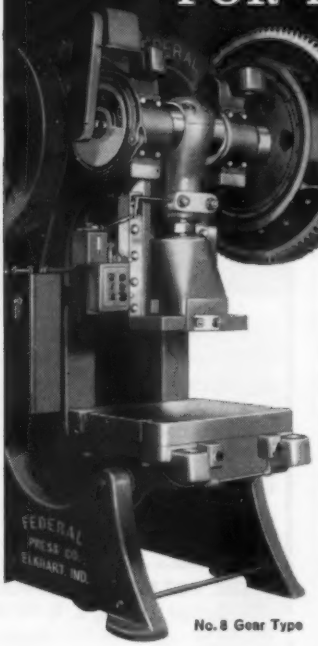
To meet modern industrial needs for faster, more continuous, more automatic production, General Electric has announced the Kinamatic line of direct current motors and generators. All motor ratings from one to 150 horsepower and all generator ratings from ¾ to 100 kilowatts are available.

Motors may be used in either con-

Now you can

PRODUCE FASTER FOR LESS

with this 100-ton FEDERAL air-clutch press



No. 8 Gear Type

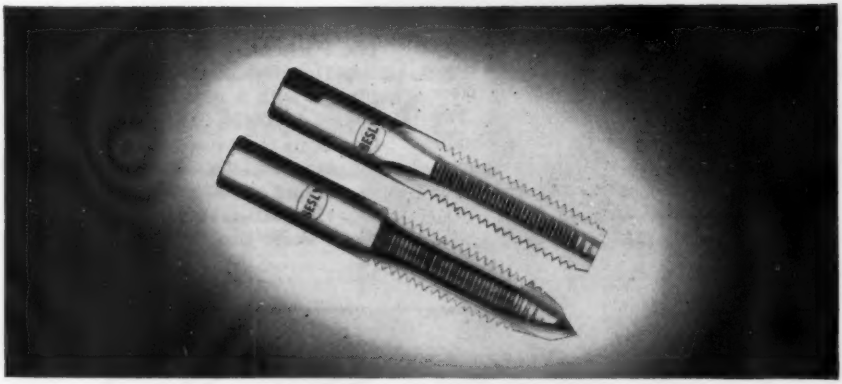
These modern Federal Presses have what it takes to step-up production and cut unit costs! Their safe, precision, fatigue-free operation *at high speeds* may be attributed to the fast-acting clutch plus other outstanding features. Dual-solenoid safety valve. Non-repeat mechanism. "Inching" control. Continuous as well as single-cycle operation. In 6.6 to 100-ton capacities. Write for new catalog showing complete line.

FEDERAL PRESS COMPANY
610 Division St., Elkhart, Ind.

FEDERAL *Open back Inclinable* **PRESSES**

31 Years of Quality Construction

Circle No. 339 on Card, Opposite Page 65



New Besly Stub Tap for Screw Machines

Saves Set-up Time, Fits Standard Bushings, Has Stronger Shank

Available at No Extra Cost from BESLY

A new, shorter length tap that eliminates the need to make alterations before using it in screw machines has just been developed by Besly in cooperation with the National Screw Machine Products Association.

SHORTER SHANK, SHORTER THREADED PORTION

The shank (and threaded portions in larger sizes) of the new Stub Tap have been shortened to enable it to fit into the space between the spindle nose and tool holder of screw machines. In the past, it has been necessary for users to cut off part of the shank and even part of the threaded portion of standard hand taps to fit them into screw machines . . . or order higher priced "specials."

SIMPLIFIES BUSHING INVENTORY

The shank of a Stub Tap is the same size as its nominal O.D. This permits standard sized bushings to be used and reduces bushing inventory problems. The full diameter shank provides greater strength than standard hand taps which have shanks usually turned down in the larger sizes.

FACTORY-PERFECT ACCURACY

The shank of the Stub Tap is made concentric with the threaded portion, assuring accurate alignment in the tool holder. Since it is not necessary to cut off the forward threaded portion of a Stub Tap, chamfer and back taper are maintained factory-perfect. Squares, except for two small driver flats at the end of the Stub Tap, are eliminated. This permits better holding power, better alignment and longer accuracy.

AVAILABLE IN SIZES THROUGH 1-IN.

The new Stub Tap is available at no extra cost from Besly distributors. It is made in fractional sizes from 1/4-in. through 1-in. and in machine screw sizes from No. 0 through No. 14. See your Besly distributor or write for the sizes you need for delivery June 1.

BESLY-WELLES
CORPORATION
122 Dearborn Ave., So. Beloit, Ill.

Established as Charles H. Besly and Company in 1875

BESLY Taps, Drills, Tool Bits, Reamers and End Mills . . .

Circle No. 340 on Card, Opposite Page 65

stant or adjustable speed applications. Speed may be adjusted by either armature voltage control, field strength control, or any combination of both. New higher base speeds are available. For constant horsepower applications, higher top speeds can be obtained through field strength adjustment. General Electric Co., Schenectady 5, N.Y.

Use ACTION Card, opposite page 64. Circle No. 103

Plate clamp

The Portomag electro-magnetic plate clamp, for industrial welding jobs, is equipped with a ratchet lever jack and a heavy duty (3000 lb.) magnetic pull.

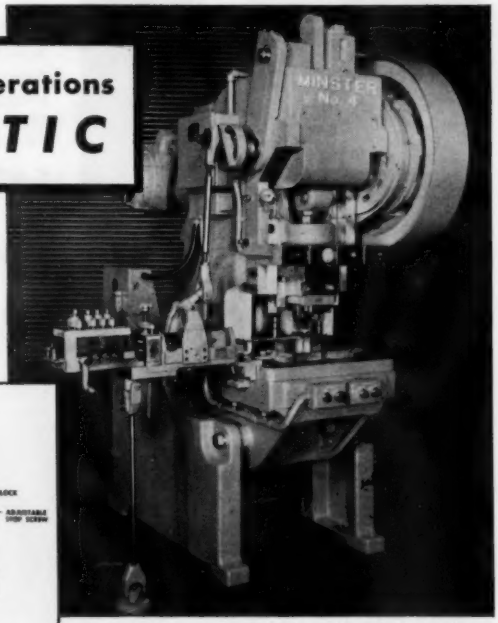
One of its most important applications is its use in plate alignment work for butt welding operations. Its heavy duty power is sufficient to straighten out warped sheet steel and its ratchet op-

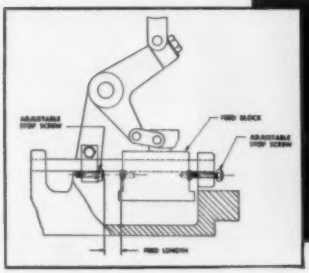
BLADES
ROLLS
WORLD'S
HARDEST METAL
● New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.
TOOLS
DIES
BAR STOCK
METAL CARBIDES CORPORATION
MC
TALIDE®
YOUNGSTOWN 12, OHIO
HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Circle No. 341 on Card, Opposite Page 65

Make Your Press Operations AUTOMATIC

The photo at the right shows an SF-1 U.S. Slide Feed with SS-07 U.S. Plain Stock Straightener (7-roll type) mounted on a No. 4 Minster Press which is equipped with an air clutch and variable speed drive.





The drawing at the left shows how feed length is controlled between positive adjustable stops on the U.S. Slide Feed. This feature assures controlled accuracy of feed length—an especially important factor in progressive die operations.

Cost reduction is of the utmost importance to you. One means of achieving this is through automatic operation. U. S. Slide Feeds are designed and built primarily for the automatic feeding of coil stock into punch presses. By using a U. S. Slide Feed with a Straightener and a Stock Reel or Coil Cradle you can convert your presses into automatic machines.

The use of this equipment gives you the double advantage of increased production and reduced labor costs, plus the feature of flexibility. Within their capacity, U. S. Slide Feeds can be easily adapted to handle materials varying in width, thickness and length of feed. Furthermore, U. S. Slide Feeds are designed so that the length of feed is controlled between positive stops as shown in the drawing, providing consistent accuracy that is especially desirable in progressive die operations.

We are sure that you want to reduce costs and speed output in your press operations. We suggest that you investigate the many advantages of U. S. Automatic Press Room Equipment. Bulletin 80-B gives complete specifications. Ask for your copy.

U.S. TOOL COMPANY, Inc.

AMPERE (East Orange) NEW JERSEY

Builders of U. S. Multi-Slides — U. S. Multi-Millers

U. S. Automatic Press Room Equipment — U. S. Die Sets and Accessories

Circle No. 342 on Card, Opposite Page 65

erated jack can be used for plate alignment work. Unit can also be used as a lift, by replacement of the portage carrying handle with a lift hook. Portomag, Inc., Dept. JS, 1511 E. Nine Mile Rd., Ferndale 20, Mich.

Use ACTION Card, opposite page 64. Circle No. 104

Self-adjusting live center for lathes and grinders

Perfection free self-adjusting live center, for lathes and grinding machines,

NEW!

Push-Button
micro-precision flat lapping

SPITFIRE
GYRO-MATIC "21"
Lapping Machine

- *Automatic! Easy Push-Button operation!*
- *Super Precise! Produces optical flatness to .0000116!*
- *Economical! Saves time, work, labor flat lapping any material!*

The new Gyro-Matic "21" means any firm . . . your firm . . . can now have finest finishing on any material! Cost is so low . . . performance so perfect . . . revolutionary advanced features so important—the Gyro-Matic "21" stands out as the most significant step forward in flat lapping in years!

18" and 24" flat lapping machines also available.

SPITFIRE ROLLER LAPPING MACHINES

Both upright and bench type models specially designed for micro-finishing cylinders, plug gages, shoulder parts, etc. in ½ the time!

Simulates figure 8 motion of hand lapping	*Simple-to-operate*	*Economically provides highest level quality control*

Write for complete detailed information *today!*

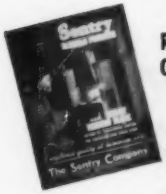
SPITFIRE Tool Co.
2937 N. Pulaski Chicago 41, Ill.

Circle No. 343 on Card, Opposite Page 65

Work in comfort with SENTRY FURNACES

When you heat treat high speed steels, you don't have to "heat-treat" your workers too. A national survey has shown manufacturers' dissatisfaction with furnace equipment that causes uncomfortable working conditions by radiating excessive heat and producing objectionable fumes. Sentry Furnaces, with their *enclosed* Diamond Block Method of atmosphere Control, reduce heat radiation and eliminate undesirable gasses and vapors, thus greatly improving working conditions around the furnace. Heat treating high speed steel tools, such as the milling cutter shown above, is typical of the fine work required from Sentry Furnaces.

Give your workers more efficient shop conditions, get a superlative product — specify Sentry.



Request Catalog S27

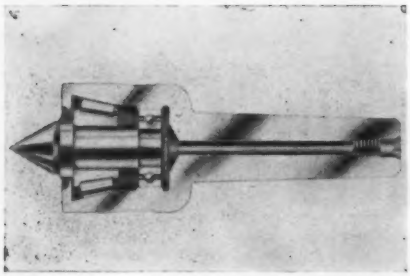
Write

Sentry ELECTRIC FURNACES

DIAMOND

THE SENTRY CO. · FOXBORO · MASS.

Circle No. 344 on Card, Opposite Page 65



feature tapered Timken roller bearings and a design which allows heavier loads with accuracy of .0001" or less The heavy and comparatively short spindle minimizes deflection and increases bearing life.

Simple in design, with only six parts, the main body of the center—all in one piece—serves as the cup for the roller bearing on which the spindle turns. Thus the end thrust from the work

HARDNESS CONVERSION CHART

For Every Shop That Does Hardness Testing

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered **free of charge** to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.

CLARK

CLARK INSTRUMENT INC.
10206 Ford Road
Dearborn, Mich.
U.S.A.

Circle No. 345 on Card, Opposite Page 65

SID TOOL COMPANY, INC. | *Your headquarters for Special Taps and Drills now stocks . . .*

HIGH SPEED **SPECIAL SIZE** MILLING CUTTERS

SIDE MILLING CUTTERS

Precision made in U.S.A.

IN STOCK FOR IMMEDIATE DELIVERY!

DIAMETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
4	7/32	1	11.40
4	9/32	1	13.35
4	5/16	1	13.70
4	7/16	1	15.05
4	9/16	1	17.15
4	11/16	1	18.10
4	13/16	1	20.85
4	15/16	1	22.95
4	1	1	23.65
4	1 - 1/8	1-1/4	25.75
4	1 - 1/4	1-1/4	28.35
5	1/4	1	17.50
5	5/16	1	17.80
5	3/8	1	19.70
5	7/16	1	20.95
5	9/16	1	23.55
5	11/16	1	26.30
5	13/16	1	28.35
5	7/8	1-1/4	30.50
5	15/16	1	31.50
6	1/4	1	21.60
6	5/16	1	22.10
6	3/8	1	23.70
6	7/16	1	25.30
6	9/16	1	31.20
6	11/16	1-1/4	33.45
6	13/16	1-1/4	35.75
6	7/8	1	36.65
6	15/16	1-1/4	38.50
8	1/4	1	47.70
8	5/16	1	49.70
8	3/8	1	51.05
8	7/16	1	53.70
8	1/2	1	54.55
8	9/16	1-1/4	56.65
8	5/8	1-1/4	57.50
8	11/16	1-1/4	59.35
8	13/16	1-1/4	60.50
8	7/8	1-1/4	62.20
8	15/16	1-1/4	63.85
10	1/4	1-1/2	87.85
10	5/16	1-1/2	88.90
10	3/8	1-1/2	83.75
10	1/2	1-1/2	92.30
10	5/8	1-1/2	105.35
10	3/4	1-1/2	121.50
10	7/8	1-1/2	131.95
10	1	1-1/2	136.70
12	1/2	1-1/2	153.95
12	5/8	1-1/2	169.75
12	3/4	1-1/2	174.35
12	7/8	1-1/2	220.10
12	1	1-1/2	236.60

STAGGERED TOOTH SIDE MILLING CUTTERS

Precision made in U.S.A.

IN STOCK FOR IMMEDIATE DELIVERY!

DIAMETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
5	1/4	1-1/4	20.95
5	5/16	1-1/4	21.85
5	3/8	1-1/4	23.20
6	5/16	1-1/4	30.80
6	7/16	1-1/4	31.85
6	9/16	1-1/4	36.70
6	11/16	1-1/4	40.05
6	13/16	1-1/4	42.15
6	15/16	1-1/4	44.55
8	5/16	1-1/4	63.20
8	7/16	1-1/4	66.80
8	9/16	1-1/4	70.55
8	11/16	1-1/2	75.65
8	13/16	1-1/2	79.35
8	7/8	1-1/2	83.25
8	1	1-1/2	87.35
10	1/4	1-1/2	87.80
10	5/16	1-1/2	89.10
10	3/8	1-1/2	90.15
10	7/16	1-1/2	95.70
10	1/2	1-1/2	99.75
10	9/16	1-1/2	110.85
10	5/8	1-1/2	113.10
10	3/4	1-1/2	129.35
10	7/8	1-1/2	133.30
10	1	1-1/2	139.20
12	1/2	1-1/2	160.45
12	5/8	1-1/2	170.95
12	3/4	1-1/2	181.45
12	7/8	1-1/2	221.65
12	1	1-1/2	238.95

DEALER INQUIRIES INVITED

If you are a user of cutting tools it will pay you to be on our mailing list. We also stock special and standard sizes in slitting saws, end mills, etc. Write for circular now to Dept. B.

SID TOOL COMPANY, INC.

Cutting Tool Specialists

158 LAFAYETTE ST., NEW YORK 13, N. Y.

Telephone: BEekman 3-4270

Circle No. 346 on Card, Opposite Page 65

keeps the tapered roller bearing perfectly seated, automatically adjusting for wear and maintaining accuracy.

To insure concentricity and alignment for the bearings, both conical and cylindrical bores of the body are ground at the same setting. To eliminate any runout of the point it is ground under load in its own bearings; consequently it runs dead true. Manufacturer: J & S Tool Co., Inc., Dept. RS, 87 Dorsa Ave., Livingston, N.J.

Use ACTION Card, opposite page 64. Circle No. 105

Cut your own gaskets

The Hargrave No. 414 gasket cutter has a light-weight phenolic body with steel blades, inch and metric scales for extreme accuracy. Cuts round gaskets ¼" to 6", odd shapes and straight pieces any size. Recommended for cutting diaphragms, disks, gaskets, patterns, shims from any pliable sheet material.

The No. 415 extension gasket cutter has an aluminum body with steel blades,

Heads...You Win!

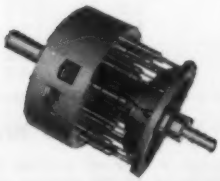
U. S. DRILL HEADS, THAT IS!

For automatic setup.

Regardless of the size of your shop, if you have high production jobs, you'll find an extraordinary reduction in tooling and manufacturing costs when you use U. S. Drill Heads.

The heads shown here, moderate in cost, are for use with automatic chucking machines and turret lathes, for drilling or tapping operations. They provide, in most cases, that a part can be completely finished in one handling.

For semi-automatic setup.



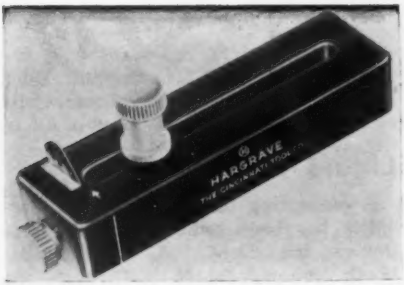
For semi-automatic setup.

Manufacturers of all types of adjustable, fixed center and individual lead screw tapping heads.

US DRILL HEAD THE UNITED STATES DRILL HEAD COMPANY

616-618 Burns Street, Cincinnati 4, Ohio

Circle No. 347 on Card, Opposite Page 65



inch and metric scales—cuts precision round gaskets of any size accurately and quickly. Extension arms increase diameter to any size. The Cincinnati Tool Co., Dept. HS, Cincinnati 12, O.

Use ACTION Card, opposite page 64. Circle No. 106

Heavy duty clamp

The jaws of the 9-inch Saxton Kant-Twist clamp are grooved on one face and serrated on the opposite face. Trunnions and jaws are case hardened

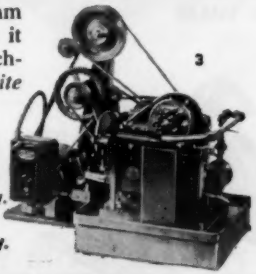
Just think!

7 SEPARATE MILLING OPERATIONS ON THIS ESCAPE WHEEL *(Enlarged View)*

You can cut *any* size you require — from the very smallest, up to large size clock escape wheels.

IF timing mechanisms are a problem you should know more about the Waltham Process. Many of the leading watch and clock manufacturers of the country are producing Escape Wheel teeth of complicated shape by the Process which is in brief: (1) Dies of precise dimension, (2) Sub Presses which are precision die sets for utilizing these dies, (3) A semi-automatic cutting machine of absolute accuracy to produce smooth-finished, close-tolerance escape wheels.

The complete story of the Waltham Machine Works Process and how it can help you with your timing mechanisms is yours for the asking. *Write us today!*



1 Dies meticulously machined to your exact specification.

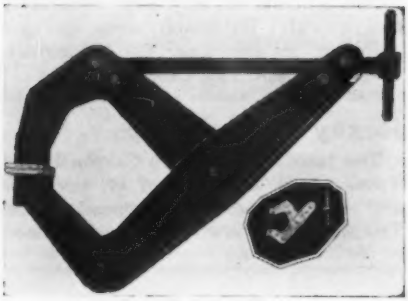
2 Sub Presses to maintain die alignment with long lived accuracy.

3 An Escape Wheel cutting mechanism of the highest accuracy.

WALTHAM

MACHINE WORKS, INC.
Waltham 54, Mass.

Circle No. 348 on Card, Opposite Page 65



and the side plates are made from hi-tensile steel. Saxton Mfg. Co., Inc., Dept. KE, 1517 North Potrero, El Monte, Calif.

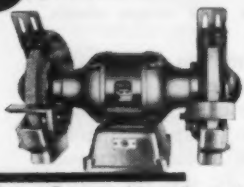
Use ACTION Card, opposite page 64. Circle No. 107

Liquid die spring

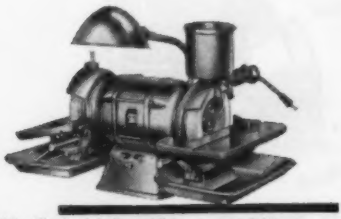
A die spring using liquid compressibility has been announced by Taylor Devices Inc., Dept. RH, 188 Main St., North Tonawanda, N.Y. Through the use of a novel internal hydraulic levering principle, Liqui Springs are reported

LESS VIBRATION . . . GREATER ACCURACY!

Baldor GRINDERS



183-10" Grinder. Every part oversize and ruggedly constructed for hard, continuous use. 1 HP, 1725 RPM. Wheels: 10" x 1" x ⅞" — 36 and 60 grit. Ideal for grinding large, odd-shaped pieces. **$148.00.**



Carbide Tool Grinder. Sharpens quickly, accurately. Reversible ½ HP motor withstands repeated overloads. 1½" wide wheels. **$169.70**

Dynamically balanced Baldor Grinders provide smoother operation, far greater accuracy. Assure hours of relaxed, fatigue-free operation. Rugged . . . durable . . . the first choice of old hands who have tried 'em all.

- **Lubricated for life ball-bearing motors never need servicing!**
- **Splash-proof, totally enclosed motors protect against dust, dirt, grit. Can't cause trouble.**
- **Models for every need! ¼ to 3 HP, 6" to 12" individually balanced wheels. Bench and pedestal types.**
- **Every model fully guaranteed.**

Write for Bulletin 321-M

BALDOR ELECTRIC CO.

4353 Duncan Ave. **St. Louis 10, Mo.**

Circle No. 349 on Card, Opposite Page 65

to develop with an identical or greater stroke up to ten times the force of a standard heavy duty coil spring of the same diameter and length.

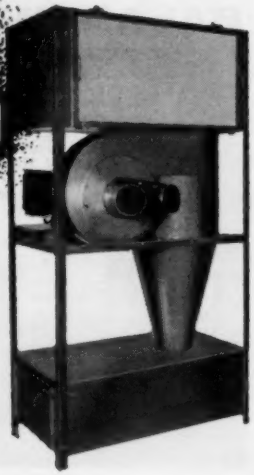
Spring illustrated, ¾" in diameter and 2½" long plus mounting stud, has a 5/16" stroke with a 600 lb. preload and an end force of 2000 lb.

Liqui Springs cut stamping costs by permitting simultaneous operations, thus reducing the number of single purpose dies. They reduce the size and cost of existing dies by decreasing the number of required drilled and tapped holes.

Use ACTION Card, opposite page 64. Circle No. 108

EFFICIENT–LOW COST

Dust Collection



Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

37 STANDARD MODELS TO CHOOSE FROM

• READY TO USE

Also a Complete Line of Mist Collectors

AGET MANUFACTURING COMPANY
1402 E. CHURCH ST. • ADRIAN, MICHIGAN

Circle No. 350 on Card, Opposite Page 65

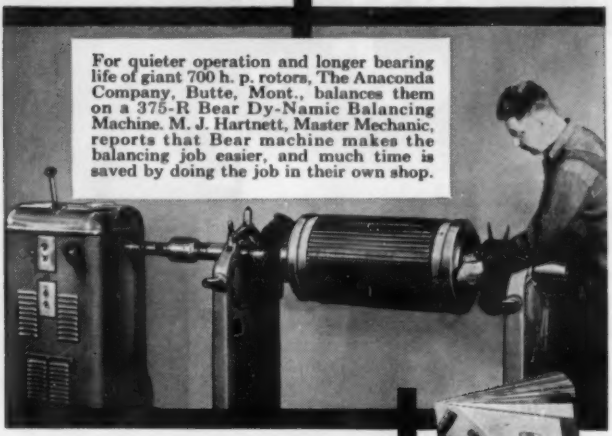
Lead testing comparator

Fast, accurate inspection of screws, while on or off a machine, is accomplished with a portable lead testing comparator now being produced by the Jerpbak-Bayless Co., Dept. RH, Solon Rd., Solon, O.

Comparator is quickly set to conform to the measurements of a master or precision screw. Checking screws after heat treating, during the finish operation or at any time that the screw is in process is a simple matter—even while on the machine. The gage also checks the amount of wear on machine

Anaconda's maintenance job made easier with **DY-NAMIC BALANCING**

...FREE CATALOG brings you Inside Facts!



For quieter operation and longer bearing life of giant 700 h. p. rotors, The Anaconda Company, Butte, Mont., balances them on a 375-R Bear Dy-Namic Balancing Machine. M. J. Hartnett, Master Mechanic, reports that Bear machine makes the balancing job easier, and much time is saved by doing the job in their own shop.

This 24-page Bear Catalog brings you all the Inside Facts on how Dy-Namic Balancing can bring down your maintenance costs! It's full of technological information, installation pictures, diagrams and specifications that will give you a better picture of how a Bear Balancing Machine will fit right into your maintenance operation...how it will reduce bearing wear...how it will eliminate vibration and cut down costly mechanical failures. For your free copy write: Bear Mfg. Co., Dept. M-20, Rock Island, Ill.

1279

BEAR
STATIC AND DY-NAMIC BALANCING MACHINES

Circle No. 351 on Card, Opposite Page 65

tool lead screws without removing them from the machine.

Standard lead testing instrument is 12" in length. It has a measuring capacity of from ⅞" thread diameter to 2½" thread diameter in any pitch.

Use ACTION Card, opposite page 64. Circle No. 109

Tap driver line improved

An improved line of Safe-Torque tap drivers will accommodate a wide range of tap sizes and provide accurate torque

adjustment to suit varied operating conditions. They prevent or reduce tap breakage, because a modified overriding clutch completely disengages the tap from the driver. Operator need not

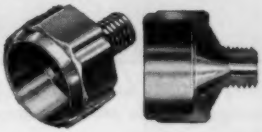
TOWNSEND OF HARTFORD

QUALI-MATIC MACHINES

ONE Townsend Automatic effects a 3 WAY SAVING

Performs 4 operations *automatically*

The Townsend Special Drilling Machine mass produces 1200 oilmeter and ammeter switch housings per hour. One machine turns, faces, deburrs, drills . . . performs four separate operations to close tolerances (plus or minus .001).



SAVES manpower costs! One man can operate 6 or more Townsend Automatics at the same time.

SAVES on machinery costs! Most Townsend machines cost as little as ⅓rd the cost of expensive multi-station machines.

SAVES through mass production! Townsend machines make it possible to pace machine capacity with production demand.

The H. P. TOWNSEND MANUFACTURING CO.
ELMWOOD, CONNECTICUT

Circle No. 352 on Card, Opposite Page 65

slow down for blind holes, and there is no noise or impact on release. Drivers operate at any speed taps can take.

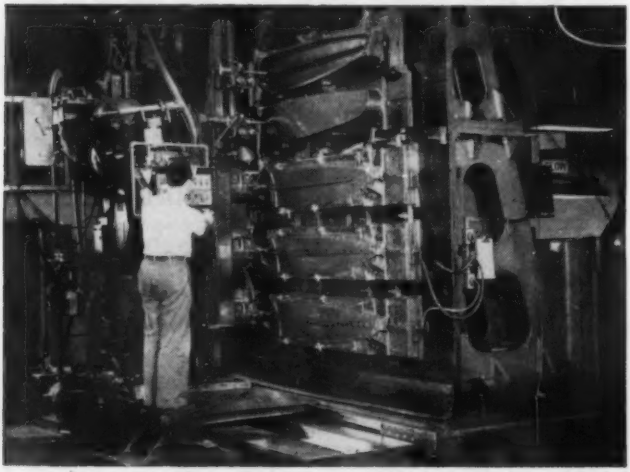
They will reduce scrap and rework since the preset torque remains constant, giving control under all conditions. "Free wheeling" release action helps to produce uniform, accurate threads. Scully-Jones and Co., Dept. JS, 1901 So. Rockwell St., Chicago 8, Ill.

Use ACTION Card, opposite page 64. Circle No. 110

Heavy-duty cylinders

Logan Ultra-mation cylinders are available in five bore sizes from 2" to 6"; pressures to 150 psi air, to 500 psi oil. There are five basic mounting styles—foot, trunnion, flange, clevis, pivot—with interchangeable covers permitting multiple mounting combinations. Covers, both front and blind end, are of heavy steel plate. Piston rods are

Walker Does it Again -



Three WALKER electro-magnetic chucks mounted on milling machine, making possible profile milling three propeller blades in one operation.

WALKER engineers and makes chucks for unusual applications as well as standard holding devices for irons and steels, non-ferrous metals and non-metallic materials.

Whatever your holding problem the originators of the magnetic chuck will solve it for you.

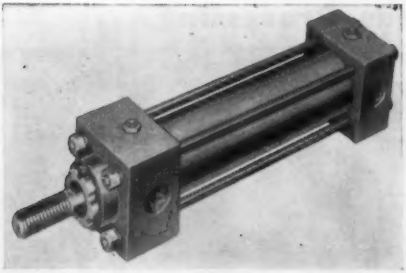
O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

IN CANADA—UPTON BRADEEN & JAMES, LTD.

Circle No. 353 on Card, Opposite Page 65



extra-heavy to carry high impact loads and have highly polished surfaces to assure minimum friction and maximum packing life.

Unobstructed ports can be relocated to any 90° position by rotating cylinder covers. Cushioning is available for either or both cylinder ends. Logansport Machine Co., Dept. HS, Logansport, Ind.

Use ACTION Card, opposite page 64. Circle No. 111

Specify IDEAL
LIVE CENTERS
Guaranteed to match the accuracy and capacity of your lathe . . .
Widest range of models, load capacities and tapers for every job!
ORDER FROM YOUR IDEAL DISTRIBUTOR OR MAIL COUPON . . .
IDEAL INDUSTRIES, Inc.
1441 Park Ave., Sycamore, Illinois
Kindly send us data on Ideal's complete line of LIVE CENTERS.
NAME
COMPANY
ADDRESS
CITY ZONE STATE

Circle No. 354 on Card, Opposite Page 65

Plating Equipment Speeds Processing

Plating line equipment recently introduced by the G. S. Equipment Co., Dept. RH, 5319 St. Clair, Cleveland, O., features a dual V-belt suspension-drive which eliminates transmission gears and cylinder bearings. Neoprene V-belts support each cylinder and load while transmitting rotation power, permitting complete cylinder load immersion.

Superstructure design has two 12" long, self-cleansing, inverted V-block cathode contacts, providing more contact area and carrying greater current flow per load. A guide channel directs superstructure into position on tank, seating inverted V-blocks on round, cathode rods on tank rim.

Danglers are directed at a downward angle through floating hubs.

Use ACTION Card, opposite page 64. Circle No. 112

Drills bring automation to drilling

The Par-A-matic air-operated drill is basically an air piston which advances an air motor which rotates the drill.

Seven models and speeds are available with features that include: automatic or semi-automatic operation; manual control valve; adjustable stroke length; needle valve feed rate control; positive piston action; interchangeable gears. Aro Equipment Corp., Bryan, O.

Use ACTION Card, opposite page 64. Circle No. 113

INCREASE PRODUCTION...

Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

• • •

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

ELIMINATE
"WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

THE FEN MACHINE COMPANY
28914 Lakeland Blvd.
Wickliffe, Ohio

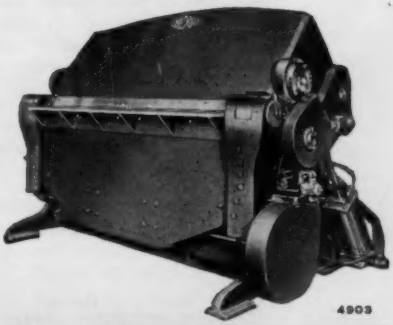
Circle No. 355 on Card, Opposite Page 65

CHICAGO **STEEL HAND and POWER**

BENDING BRAKES

for Single and Quantity Runs
BENDING STEEL PLATE
and SHEET METAL

Special Bending Brakes
Double Folder Brakes



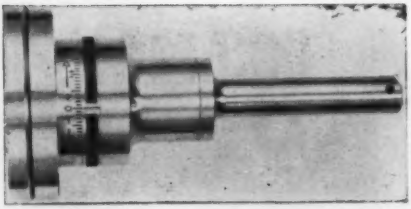
4903

DREIS & KRUMP
MANUFACTURING COMPANY
7440 S. Loomis Boulevard, Chicago 36, Illinois

CHICAGO
STEEL BENDING BRAKES
BOX and PAN BRAKES
PRESS BRAKES

Circle No. 356 on Card, Opposite Page 65

Boring bars cut production costs



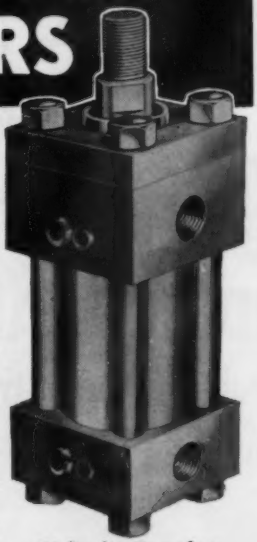
Deka-Bore boring bars are said to eliminate 90% of the time and labor costs involved in setting and adjusting tool bits on close tolerance precision boring. The operator can adjust the tool bit infinitely in either direction without backlash.

The accuracy of the adjustments is obtained by a series of ground and lapped hardened tool steel eccentrics which are assembled by selected fits

over 8,000 Different Selections For Immediate Delivery!

Miller - Quality-Famous, Heavy Duty AIR AND HYDRAULIC

CYLINDERS



now "in stock" for immediate shipment to you in popular sizes, mountings

Eliminate costly production delays —speed-up your design and replacement programs — with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.

Write for Complete Data and Prices

Miller

MILLER FLUID POWER DIVISION
FLICK-REEDY CORP

2026 N. HAWTHORNE AVE., MELROSE PARK, ILL.

CYLINDERS • BOOSTERS • ACCUMULATORS
Sales and Service From Coast To Coast

Circle No. 357 on Card, Opposite Page 65

and are sealed off from the possibility of dirt and dust penetration. Adjustments are made by loosening three screws and rotating a knurled member the required amount, as shown by the matching lines which are calibrated on the periphery of the body diameter. This permits rapid adjustments in increments of .0001 on the diameter of .00005 on the radius.

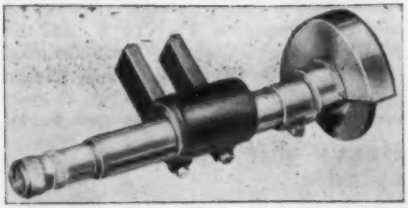
A series of eight interchangeable quills have a range of ½" to 3" in the A-2P model and a similar number of quills range from 1⅜" to 6" in the A-4P model. Precision Tool & Mfg. Co., Dept. HS, 1305 S. Laramie, Cicero 50, Ill.

Use ACTION Card, opposite page 64. Circle No. 114

Heavy duty grinding spindle

Setup is made with the spindle only and the flexible shaft motor power is not coupled on until ready to grind, when

TRU-O-SEAL
TEFLON SEAL
STOPS PIPE THREAD LEAKS instantly!
PAT. PENDING
Prevents future leaks!
TRU-O-SEAL does away with messy pipe "dope" compounds, eliminates damage caused by overtightening of conventional leaky joints, and is immune to ALL known hydraulic fluids and to steam, air, water, solvents, and practically all gases and chemicals. It withstands temperatures from —100° F. to plus 500° F., saves cost and labor of special or welded fittings, and has been fully field tested and proven by leading manufacturers. Comes in ⅛" to 2½" pipe thread sizes.
Write for data and prices
TRU-O-SEAL DIVISION
Flick-Reedy Corporation
2026 N. Hawthorne Melrose Park, Ill.
"Miller Fluid Power" is also a Div. of Flick-Reedy Corp.
1 Thread TRU-O-SEAL on pipe or fitting (no messy pipe "dope" needed).
SEAL SIDE
2 Thread pipe or fitting 4 threads into port. Point in desired direction.
3 Tighten TRU-O-SEAL to complete leakproof assembly (only light torque required).
Circle No. 358 on Card, Opposite Page 65



using the heavy duty Wyco grinding spindle. With a Wyco flexible shaft machine, it is claimed that the motor or V-belt drive cannot transmit vibration to the grinder spindle.

Features: Welded steel double shank straddles tool post; split eccentric sleeve adjusts for lathes from 12" to 18" swing; quick change socket snaps on and off; interchangeable adapter fits Wyco No. 1 and 2 and 3 to 5 shafts; grinding wheels up to 5" dia.; removable wheel guard. Wyzenbeek & Staff, Inc., Dept. RB, 223 N. California, Chicago, Ill.

Use ACTION Card, opposite page 64. Circle No. 115

100 TO 40,000 POUND COIL CAPACITY

LITTELL REELS

No. 25-18—Littell Motor Driven Automatic Centering Reel With Arm Control. Coil Capacity, 2,500 lbs.

Ask for a Littell Coil Weight Calculator

Whether you feed stock from 100 pound coils or 40,000 pound coils, there is a Littell Automatic Centering Reel to meet your needs . . . motor driven, electric brake and plain brake reels. Every Littell Reel is designed for swift, safe coil replacement and smooth, *controlled* uncoiling. All models combine smooth running accuracy with rugged construction that assures *extra* years of dependable service.

Write for Littell Reel Catalog Data

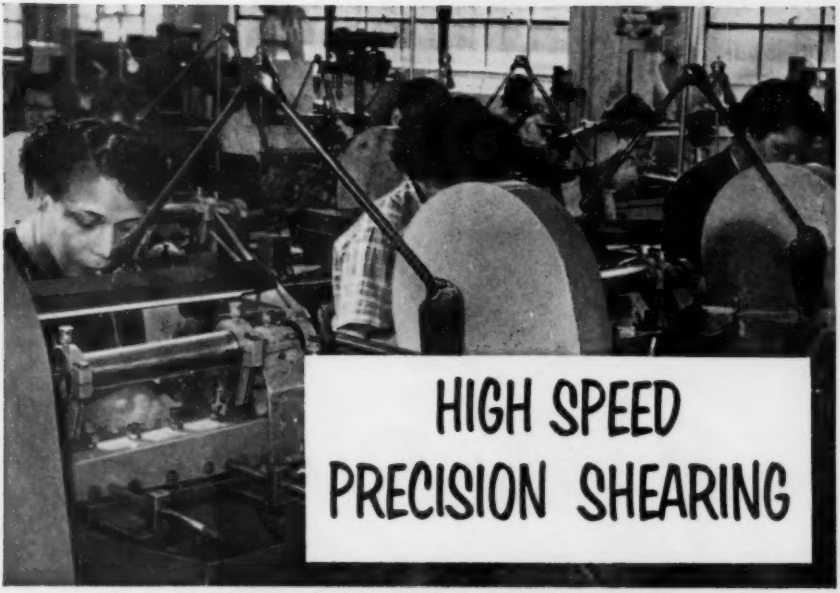
F. J. LITTELL MACHINE CO.

Speed with Safety

ROLL FEEDS • DIAL FEEDS
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES
District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Circle No. 359 on Card, Opposite Page 65



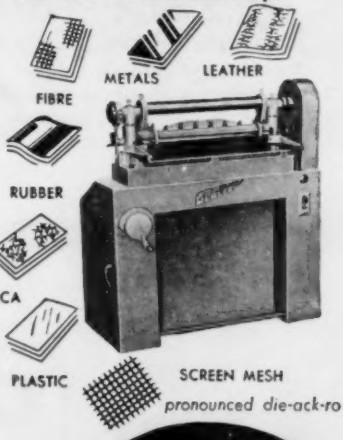
HIGH SPEED PRECISION SHEARING

Production shearing of nickel sintered plates to ± .010" at Sonotone Corp.

DI-ACRO POWER SHEAR

COAST TO COAST FAVORITE FOR—

- **PRECISION**—strips less than .025" wide accurately sheared, parts exactly duplicated.
- **CUTTING SPEED**—from 30 to 200 strokes per min. Continuous and single stroke operation.
- **CAPACITY**—16 gauge sheet steel.
- **SIMPLICITY**—no experience needed to operate.
- **RUGGED CONSTRUCTION**—backed by warranty.
- **SELECTION**—four models, immediate delivery.
- **ECONOMY**—price and operating costs are rock bottom.
- **ENGINEERING SERVICE**—always at your disposal.



pronounced die-ack-ro

SEND FOR SHEAR MANUAL

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write:

O'NEIL-IRWIN MFG. CO. 314 8th Ave., Lake City, Minn.

di-acro PRECISION METALWORKING MACHINES

Circle No. 2A on Card, Opposite Page 65

To get clean wipers at the tool crib, this lathe operator must leave his machine, make the hike, then stand in line. He makes the trip at least once a day, takes several minutes to do it.

He has to waste 60 minutes a week

Easy to distribute . . .
always a clean one handy

They really soak up oil . . .
good for solvents, too

When thoroughly used . . .
toss 'em in the trash

With a carton of 125 clean Scott Wipers at every workbench, daily wiper replacement is often unnecessary. One carton can last for days and a man has a fresh supply right at his fingertips.

. . . He stays on the job

The difference is . . . Scott Wipers

Check your production line. See how much time the men are forced to waste each day in order to keep supplied with fresh wiping material.

Not so with Scott Wipers. These are disposable wipers. Complicated distribution is ended. So is sorting, baling, handling and laundering.

Your local Scott representative or distributor stands ready to demonstrate the Scott Wiper in your plant. Call him or mail this coupon today.

Scott Paper Co., Dept. 3-M
Chester, Pa.
Send details on Scott Wipers.

Name_____

Company_____

Position_____

Address_____

You can be certain . . . if it's "RFC"

Maintains original setting regardless of use or wear. No ratchets or pawls to wear down and "throw off" feed spacing. Models to fit all presses.

WRITE FOR LITERATURE

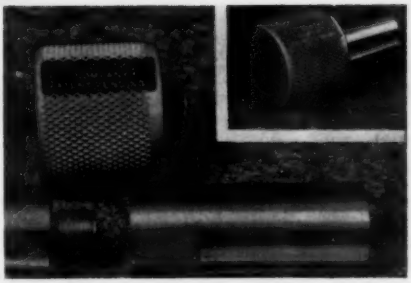
"MANUFACTURERS OF QUALITY FEEDS FOR POWER PRESSES"

Roll Feeds Corp.

ASHTON, R. I.

Circle No. 2D on Card, Opposite Page 65

Adjustable flush pin gage

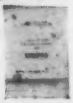


This adjustable flush pin gage may be set to measure the depth of a wide range of machined holes within an accuracy of four decimal places. This eliminates having to design, order, and wait for a new gage each time specifications are changed.

Gage is machined of tool steel in three pieces. It may be adjusted simply by loosening a locking screw, turning

NELCO CARBIDE TIPPED MILLING CUTTERS . . .
CUT YOUR OVERHEAD!
You DON'T grind steel with a diamond wheel — when you use NELCO Cutters!
All carbide cutting surfaces overhang steel body!
NELCO sandwich braze guarantees a rugged, one piece cutter that works to close tolerances, can't chatter, teeth don't work loose!
NELCO pioneered slash milled design —gives more chip clearance—means less grinding
Gang cutting made simple—slot, maintain width with multiple cutters and shims!

Those who buy tools for lasting performance as well as initial appearance always specify "Nelco" These carbide tipped Milling Cutters are precision built for rugged dependability, engineered to "take it"—singly or in gangs—to save *real money*, deliver fast and accurate results without the operational and maintenance "headaches" of most conventional cutters. Look for benefits *and* appearance—call for Nelco—your distributor has the size and type you need in stock.



SEND FOR 24 page manual "Suggestions for Operating and Maintaining Nelco Tools"!

NELCO TOOLS

For that EXTRA Edge in Production!

NELCO TOOL CO., Inc. • Manchester, Conn.

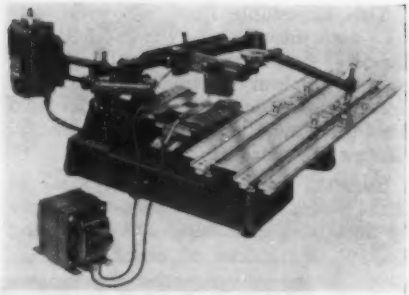
Circle No. 360 on Card, Opposite Page 65

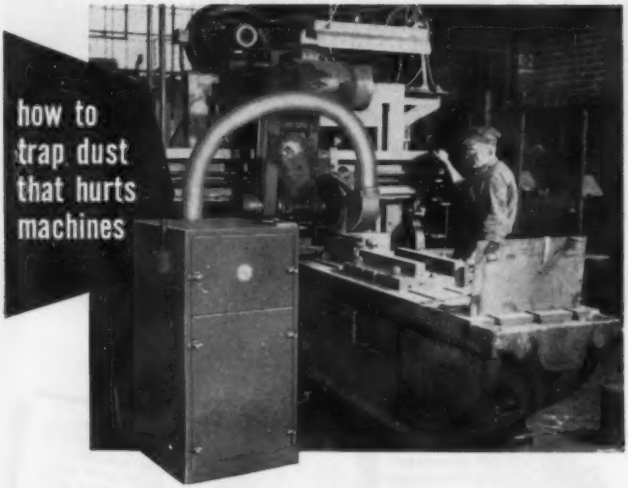
the adjustable contacts to the proper dimension, and relocking the screw. Size Control Co., Dept. RB, 2500 W. Washington Blvd., Chicago 12, Ill.

Use ACTION Card, opposite page 64. Circle No. 116

Electric arc etching unit for hardened steel and alloys

Extremely hard surfaces can be marked with a tracer-guided electric arc etching unit manufactured by the





Moveable TORIT units let you trap dust at its source

Untrapped dust costs you money: "secretly" forces your precision machines out of alignment, slows production, hurts morale. Torit dust collectors solve the problem—fit in almost anywhere. Usually more efficient and money-saving than central (built-into-the-building) systems.

You can move and install Torit units yourself. We'll check the installation—or handle the entire problem if you prefer. Torit units operate only when machines they protect are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

TORIT MANUFACTURING CO.
601 Walnut Street, St. Paul 2, Minn.

Circle No. 361 on Card, Opposite Page 65

New Hermes Engraving Machine Corp., Dept. MG, 13-19 University Pl., New York City 3.

The process eliminates the use of acids. Marking of rounded surfaces convex or concave as well as irregular contours, is considerably simplified. The marking leaves no burrs. Tracer-guided electric arc etching allows the marking of parts in a finished state.

Use ACTION Card, opposite page 64. Circle No. 117

Dividing head line redesigned

A new line of precision dividing heads, re-designed primarily for their universal milling machines, has been announced by the Cincinnati Milling Machine Co., Dept. HS, Cincinnati 9, O. Heads are accurately built for high precision work and ruggedly constructed for variety toolroom work such as

for automatic feeding of Small Parts

SYNTRON

PARTS FEEDERS

of proven dependable Quality

more production, lower job costs

Syntron Vibratory Parts Feeders provide an automatic feed method that will select and feed parts of practically any size, shape or material—single file in oriented position through a gravity fed track to usage points at controllable rates to meet capacities of operations. Electromagnetic vibrations can increase your production automatically.

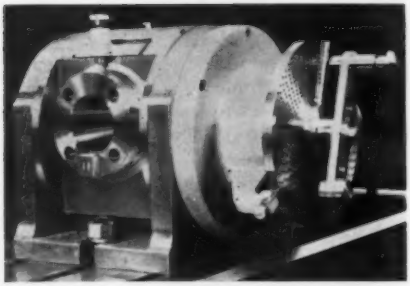
Write for Catalogue data - FREE

Write for FREE Catalogue Data

SYNTRON COMPANY

300 Lexington Ave. Homer City, Pa.

Circle No. 362 on Card, Opposite Page 65



gear cutting, cam milling, drilling and boring, etc.

Spindle is mounted on precision anti-friction bearings, carried in a block having 360° peripheral clamping. Spindle nose and taper hole conform to No. 50 milling machine standard. The block itself is mounted in a housing to allow 145° angular positioning of the spindle in the vertical plane.

The indexing arrangement at the side

quadrill

4 Position Drilling and Tapping

TURRET HEAD

Does the work of 4 drill presses

DRILLS • REAMS
COUNTERSINKS
COUNTERBORES

The quadrill performs all these operations without setting up each time. Any of four cutting tools can be brought into drilling position by indexing the turret. A real time and cost saver!

FITS ALMOST ANY DRILL PRESS

TAP with the quadtapper

By attaching the QUAD-TAPPER to any of the four spindle assemblies of the QUADRILL, you can drill and tap almost simultaneously. Affords accurate tapping at high speeds.

DESIGNED FOR PRODUCTION COST CUTTING

Send for complete details of both QUADRILL and QUAD-TAPPER construction and operation features.

CHICAGO QUADRILL
Company
1846 BUSSE HIGHWAY • DES PLAINES, ILL.

Circle No. 363 on Card, Opposite Page 65

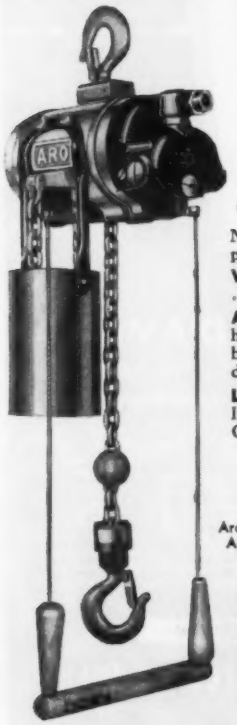
of the head consists of a crank with a retractable pin handle, sector for spacing, and reversible index plate. Rotating motion of the crank is translated through a worm to a worm wheel keyed to the spindle. The worm is also mounted on precision ball bearings, and carried in a yoke which is eccentrically mounted in the block. This construction provides a means of quickly disengaging the worm to employ direct indexing method.

Use ACTION Card, opposite page 64. Circle No. 118

Knurled head swivel-pad clamp

A swivel pad clamp for use where finger-tight clamping is sufficient, has a wide knurled head which assures good gripping and fast screw run-in. Ball-joint pad construction provides smooth angle adjustment and rotation of pad. The pad swivels 7½° each side of the center line in all directions to accommodate off-angle surfaces. The

AIR LIFT



Faster! Safer!

NEW LINK CHAIN AIR HOIST!*

*ROLLER CHAIN ALSO AVAILABLE—ALL MODELS

NEW Link Chain Hoist now added to the popular ARO line . . . up to 1000 lb. jobs!

VARIABLE SPEED... 0 to 38′ per minute . . . load can be inched or zipped.

AIR-POWERED FOR SAFETY... no spark hazard . . . explosion-proof motor . . . can't burn out . . . can't overheat . . . unaffected by dust or fumes.

LIGHTWEIGHT... only 29 lbs. . . . overall length 10½″. Can be converted to Roller Chain type if desired.

See Your ARO Distributor

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio

Aro of California, 4131 S. Grand Ave., Los Angeles 7
Aro Equipment of Canada, Ltd., Toronto 15, Ontario
Offices in All Principal Cities

ARO® AIR HOISTS

Also . . . Air Tools . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings . . .

Circle No. 364 on Card, Opposite Page 65

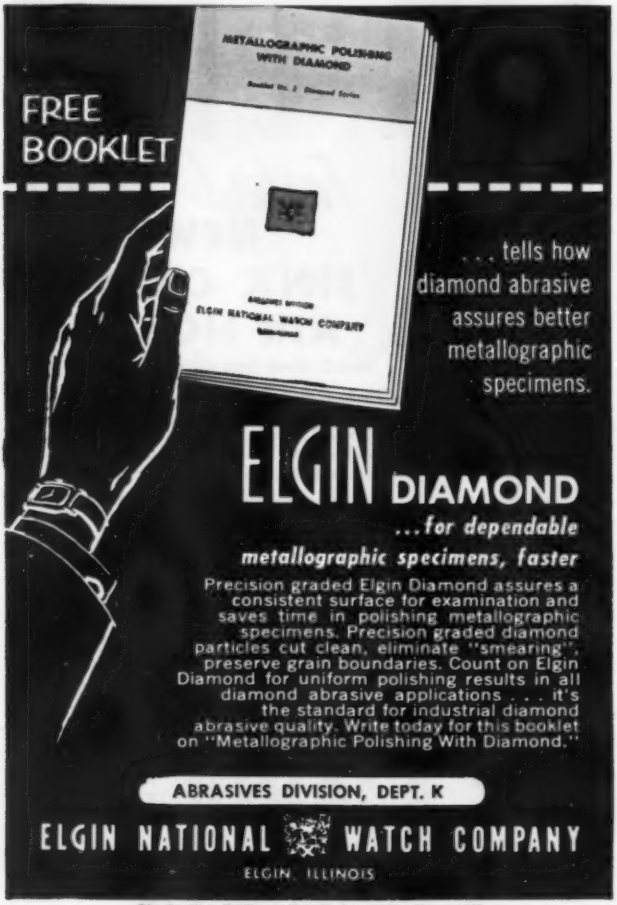
large, flat pad face assures tight clamping.

The body is made from heat-treated alloy steel, and is Du-lited for rust proofing. It is available in 1½" and 2" screw lengths, and five screw diameters. Vlier Engineering, Inc., Dept. KE, 8900 Santa Monica Blvd., Los Angeles 46, Calif.

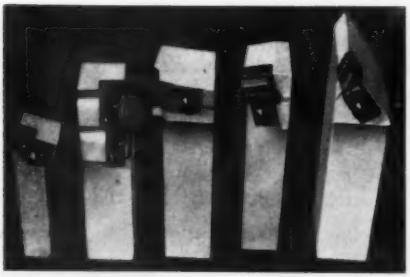
Use ACTION Card, opposite page 64. Circle No. 119

Carbide inserts and throwaway holders

Valenite carbide inserts and throwaway holders offer tips in four grades.


FREE BOOKLET
METALLOGRAPHIC POLISHING WITH DIAMOND
ELGIN NATIONAL WATCH COMPANY
. . . tells how diamond abrasive assures better metallographic specimens.
ELGIN DIAMOND
. . . for dependable metallographic specimens, faster
Precision graded Elgin Diamond assures a consistent surface for examination and saves time in polishing metallographic specimens. Precision graded diamond particles cut clean, eliminate "smearing", preserve grain boundaries. Count on Elgin Diamond for uniform polishing results in all diamond abrasive applications . . . it's the standard for industrial diamond abrasive quality. Write today for this booklet on "Metallographic Polishing With Diamond."
ABRASIVES DIVISION, DEPT. K
ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS

Circle No. 365 on Card, Opposite Page 65



There are two ranges, general purpose and heavy duty, and each range has three thicknesses. Valenite Metals Corp., Dept. JS, Box 205, Royal Oak, Mich.

Use ACTION Card, opposite page 64. Circle No. 120

Combination gage

The Bryant combination squareness of face and concentricity gage is shown here checking aircraft cylinder hold-down bolts. Three simultaneous checks are made: size of 7/16 - 20 nf—3 threads;

Look into the complete, cost-cutting **LOVEJOY** *line. Standard tools are in stock – to help you increase production, save time and money now!*

INSERTED-TOOTH MILLING CUTTERS

Face, side, end, slotting and boring mills.

H. S. S., CARBIDE, ALLOY BLADES

Interchangeable in all Type "A" milling cutters from 4½" to 24" in diameter.

NEW! SET-SCREW TYPE END MILLS

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

Boring Tools • Arbors • Flywheels
Lovejoy Milling Cutter • Assembly Gage

Special cutters are a Lovejoy specialty

Write for new catalogs: No. 31 (Face Mills), No. 32 (Side Mills), No. 33 (Arbors).

136 MAIN ST., SPRINGFIELD, VERMONT

Send for free **SPEED & FEED CALCULATOR**

LOVEJOY TOOL COMPANY, INC. Ltc
SPRINGFIELD, VERMONT, U. S. A.

Circle No. 366 on Card, Opposite Page 63

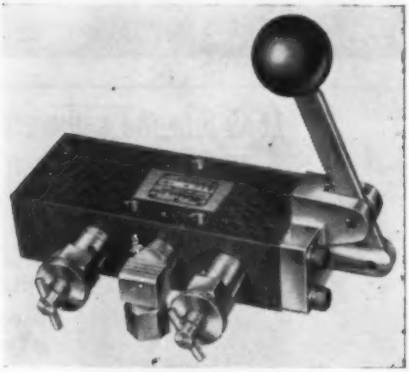
concentricity of .435 - .434 diameter in relation to thread; under face squareness of bolt head bearing surface in relation to thread.

A ball slide follower attachment used with the gage compensates for thread progression as the work part is turned. Bryant Gage & Spindle Div., Dept. JP, Box 620, Springfield, Vt.

Use ACTION Card, opposite page 64. Circle No. 121

Speed control valve for air cylinders

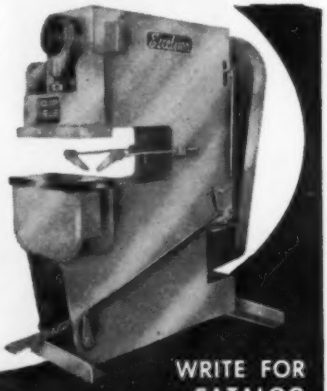
A compact throttling-type to mount directly in control valve exhaust ports



Priced with the lowest— engineered with the best!

Excelsior ALL STEEL

DEEP THROAT PRESSES



10 thru 50 Ton Capacities —12", 18" and 24" Throat Depths

WRITE FOR CATALOG

Excelsior TOOL & MACHINE CO.

RIDGE AVE. and 31st , EAST ST. LOUIS, ILL.

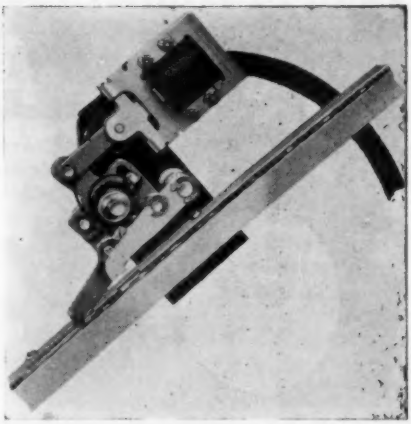
Makers of Precision Machinery For the Metal Working Industry Since 1892

Circle No. 367 on Card, Opposite Page 65

is made in ¼", ⅜" and ½" NPT pipe thread sizes. This Modernair Model 500 exhaust speed control valve is precision machined from non-corrosive brass bar stock. Parts are permanently assembled; adjusting screw cannot be blown out. No tools are required for flow adjustment; needle valve can be adjusted and locked by hand.

Valve screws into either or both exhaust ports of a 5-port, 4-way valve to provide speed control of air cylinder piston in one or both directions, or into exhaust port of a 3-way valve to regulate piston return speed on a single-acting cylinder. Modernair Corp., Dept. KE, 400 Preda St., San Leandro, Calif.

Use ACTION Card, opposite page 64. Circle No. 122



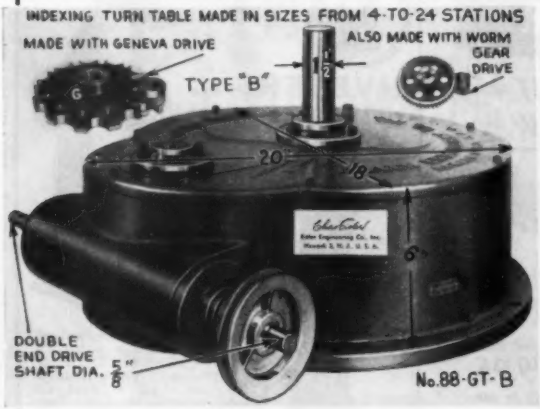
Standard unit for parts escapement

Dixon Automatic Tool, Inc., Dept. RB, 2340 23rd Ave., Rockford, Ill., has announced a standardized parts escapement designed to be attached at any point along the feed track.

Spring loaded fingers automatically release individual parts up to 3" in diameter. No special slots or track junctions are required. Solenoid or air cylinder operation.

Use ACTION Card, opposite page 64. Circle No. 123

INDEXING MACHINERY — CAMS — GENEVA GEARS — TURNTABLES



MFG. REP. WANTED **ASK FOR CATALOG No. 88-57**

DR. CHARLES EISLER ME. FOUNDER — CHARLES EISLER, JR. PRES.

EISLER ENGINEERING CO., INC.

762 SOUTH 13th STREET — NEWARK 3, NEW JERSEY

Circle No. 368 on Card, Opposite Page 65

PRODUCTION TOOLS BY APEX

THE ORIGINAL ADJUSTABLE SHANKLESS SERRATED CUTTING TOOL

←MEDIUM DUTY FACE MILLER

This miller may be had in fine tooth or in heavy duty style. High speed, cobalt or carbide tipped blades, adjustable for wear. Drop forged, heat treated body. Send for catalog showing "Apex" cutters, reamers, boring heads, and single point tools—all carbide tipped when required.

THE APEX TOOL & CUTTER CO.,
SHELTON 14, CONN.

Circle No. 369 on Card, Opposite Page 65

WALLS TU-WAY BELT SANDER

USE IT EITHER WAY

At last, a top quality industrial sander that provides all the most wanted features – yet sells for so little. $89.95 complete with cord, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

Circle No. 370 on Card, Opposite Page 65

GRANT RIVETERS . .

PIONEERS and PACEMAKERS in their line

—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 5, Conn.

Circle No. 371 on Card, Opposite Page 65

Skiving and shaving tools

Two new tools, one for skiving and one for shaving, may be used either on single or multiple spindle automatic machines or for turret lathes. The shaving tool mounts directly to the cross slide circular tool post of any single or multiple spindle automatic or turret lathe. Mounting the tool can be accomplished without dismantling or without special mounting brackets.

When the spindle rotates in a forward direction the tool is normally used on the rear cross slide. With the spindle rotating in the backward or opposite direction, the conventional front post mounting is used. The application of the shave tool is limited only by the mounting method integral with the machine. Since the shaving tool uses a flat spring to compensate for pick up, fine adjustments can be made regard-

KUMA

40% FASTER INDEXING
WITH ACCURACY to .0003

PRECISION and SPEED best describes the KUMA dividing head, the versatile tool with 1001 uses. Equipped with precision Timken bearings and Garlock oil seal.

- Concentricity of bore .0003.
- 0 to 90° elevation.
- 360° swivel of head on base.
- 5C collet capacity.
- Uses interchangeable index plates.

SEND FOR COMPLETE LITERATURE

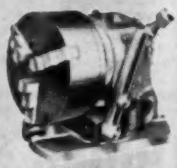
KUMA TOOL CO.
DIVISION OF Production Tool Corporation
4712 S. Kenwood Ave. Chicago 15, Ill.

PRECISION UNIVERSAL DIVIDING COLLET HEAD

ANGLE DRESSER

COLLET CLOSER

RADIUS DRESSER



CHUCK ADAPTER

Circle No. 372 on Card, Opposite Page 65

less of whether the blade or roller is on top.

The skiving tool mounts to the circular cross slide tool post of any automatic which uses a circular form tool. The holder is designed so it can skive either over or under the work. This is accomplished by the use of a riser block when the spindle is running in a forward position and the cutter is mounted on the front tool slide. Smith Tool Co., 10607 Meech Ave., Cleveland.

Use ACTION Card, opposite page 64. Circle No. 124

SELLEW (adjustable) stock drillheads will greatly increase your drilling output

STOCK SIZES AS SHOWN
No. 0-S (2 spin.)—drill cap. ⅛"
No. 0-AD (3 spin.)—drill cap. ⅛"
No. 0-D (3 spin.)—drill cap. ¼"
No. 1-D (3 spin.)—No. 1 M. tap.
No. 2-D (3 spin.)—No. 2 M. tap.
No. 3-D (3 spin.)—No. 3 M. tap.

Send us your drilling requirements.

Sellew Machine Tool Co.
PAWTUCKET, R. I.
Inc. 1910

Circle No. 373 on Card, Opposite Page 65

Barrels for tumbling machine

Rampe precision finishing barrels, ranging in size from 1 gallon to 8 cu. ft. capacity, may be purchased individually for replacement or for shops that wish to build their own tumbling machine. Turn table or flange mounting plates are also available. Rampe Mfg. Co., Dept. RH, 14915 Woodworth Ave., Cleveland 10, O.

Use ACTION Card, opposite page 64. Circle No. 125

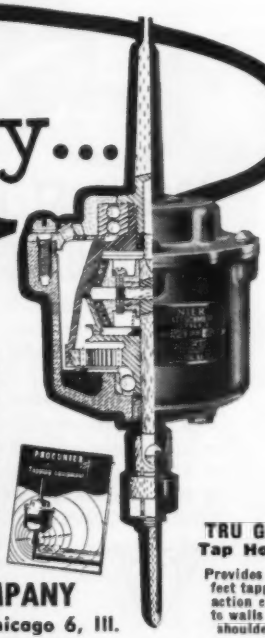
Get the complete, revealing

Inside Story...

on the finest tapping heads ever made!

A complete feature by feature analysis on the amazing Procunier Tapping Line is yours for the asking! Shows the many outstanding construction improvements, mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with minimum "down-time", faster production, with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease that helps operators maintain stepped-up production schedules.

Write for FREE Brochure giving full details and specifications on the Procunier Line



TRU GRIP Tap Holder

Provides Perfect tapping action close to walls and shoulders.

PROCUNIER SAFETY CHUCK COMPANY
14 S. Clinton St. Chicago 6, Ill.

Circle No. 374 on Card, Opposite Page 65

New 1956 Model "88"

RADIUS DRESSER

Outperforms them all

Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations. Write for free illustrated folder.

At new low price $124.50 with diamond

SOMERSET TOOL CO. 244 Virginia St. Hillside, N. J.

Circle No. 375 on Card, Opposite Page 65

NEW NESTING TYPE

TOTE PANS

Sturdy 16 ga. metal. 20" long x 12" wide x 6¼" deep. Drag holes and handles at both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

Circle No. 376 on Card, Opposite Page 65

Handle your small part precision

JIG BORING on the LINLEY JIG BORER

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, *where large work belongs.* You'll save money this way.

SPECIFICATIONS:
Table Movement: 9"x16"
Table Size: 7"x17½"

Complete details sent promptly on request

LINLEY BROTHERS CO.
State St. Ext. Bridgeport 1, Conn.

Circle No. 377 on Card, Opposite Page 65

STEEL **Stanho** PRODUCTS

FLAT BOTTOM **WOODRUFF KEYS**

MACHINE KEYS

TAPER PINS

the Quality Line

of Precision Made Steel Products

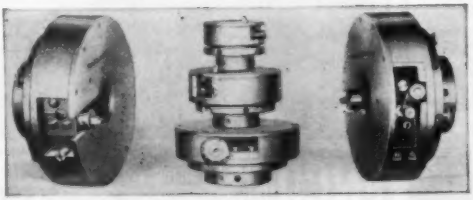
KEYS—ALL TYPES · COTTER PINS
TAPER PINS · STRAIGHT PINS
MACHINE RACK · SPECIAL PARTS

KOOLHEAD Foundry Chill Nails

WRITE for DESCRIPTION and PRICES

STANDARD HORSE NAIL CORP

Circle No. 378 on Card, Opposite Page 65



MUMMERT-DIXON

FACING HEADS

with Automatic Feed

One-way Tool Feed—6, 9 and 12" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

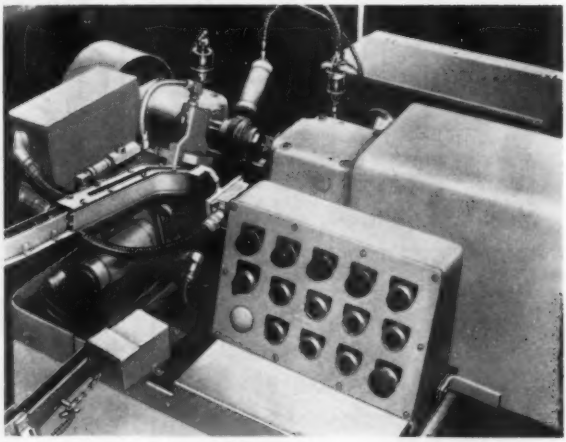
Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Circle No. 379 on Card, Opposite Page 65

Gear Speeder Has Electronic Ear

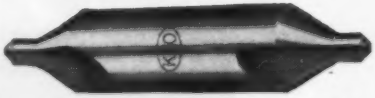


A fully automated Red Ring gear speeder which includes an electronic "ear" that automatically inspects and rejects gears based on operating sound level prevents human sound level appraisal errors and thus provides precise selection of gears having uniform sound characteristics.

This Model GSR gear speeder handles the smaller sizes of pinion gears. Gears are automatically loaded, run in both directions in mesh with another gear with and without brake loading, unloaded, and passed or rejected by the electronic sound discriminator unit whose microphone is placed, near the gear mesh area. The sound discriminator unit may be adjusted at any time to the range of audible noise frequency and intensity

KEO

COMBINED DRILLS



and COUNTERSINKS

- Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints.

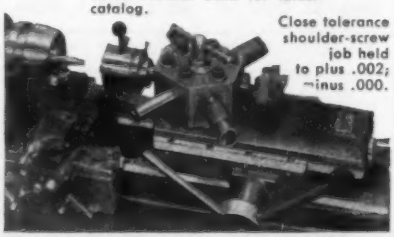
Jobbers' Inquiries Invited

KEO CUTTERS
19326 Woodward · Detroit 3 Mich.

Circle No. 380 on Card, Opposite Page 65

Enco Self-Indexing HEXTURRET Cuts Production Costs!

- Double Drive Gears
- Double Racks
- Assures Equalized Power
- Extreme Accuracy
- Mfgrs. most complete line of Lathe Turrets. Send for latest catalog.



Close tolerance shoulder-screw job held to plus .002; minus .000.

ENCO Manufacturing Co., Dept. 276
4524 W. Fullerton Ave., Chicago 39, Ill.

Circle No. 381 on Card, Opposite Page 65

desired for rejection.

Pinions can be fed to the speeder unit from a conveyor unit or loaded manually into a magazine feed on the machine. National Broach & Machine Co., Dept. JS, 5600 St. Jean Ave., Detroit 13, Mich.

Use ACTION Card, opposite page 64. Circle No. 126

Tapping attachment

The model SA-2½ B tapping attachment has a capacity of 1⅛"-1⅝", features weightless floating action and positive torque control clutch. Eliminates human and mechanical lead error. Taps are permitted to float into the workpiece without any movement of the machine spindle, thereby assuring uniform threads.

Adjustments of the clutch are made for the different sizes of taps and various types of materials so that the tap will stop when it becomes dull, loaded or bottoms in a blind hole. Longer tap life and faster tapping production is thus made possible. Tapmatic

Corp., Dept. KE, 845 W. 16th St., Costa Mesa, Calif.

Use ACTION Card, opposite page 64. Circle No. 127

when only a diamond tool will do the job... ASCO has the answer!

The right diamond for the right tool. *Manufacturers:* diamond tools, wheels, compound. *Importers & dealers:* carbons, bortz, ballas. WRITE TODAY FOR FREE CATALOGS & LITERATURE.

ANTON Smit & CO. INC.

Specialists in diamonds and diamond tools since 1908.

111 Eighth Ave., New York 11

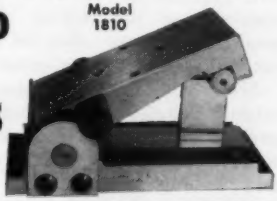
Representatives: Territories Open; Inquiries Invited

Circle No. 382 on Card, Opposite Page 65

Precision • Convenience • Economy

HINGED SINE PLATES 5" and 10"...AT LOW COST

Model 1810



Bald Eagle Sine Plates are *Guaranteed Accurate* within .0002" in center distance and parallelism for length of tool. Double normalized for maximum stability. Adapted for permanent magnetic chuck. No. 1810 has .1000" recess and heavy duty side rail.

Positive Locking Device
Precision Ground
Hardened Rolls
Immediate Shipment

No.	Center Dist.	Top Width	Price
1805	5"	3"	$109.50
1810	10"	5"	265.00

Bodies Hardened at Extra Cost. FOB St. Paul

Write for literature on complete line. Order from your dealer or direct.

Bald Eagle Tool Co.

357 Minnesota St. • St. Paul 1, Minn.

Circle No. 383 on Card, Opposite Page 65

Grinder Handles Large Single-Point Tools

Equipped for either wet or dry face grinding of large, single-point tools, a double-end tool grinder, Style 48-B, can be used for roughing out all sizes of shanks. With suitable wheels the machine will recondition tools of high speed steel, cast alloys and carbides.

Two 10-inch plate mounted wheels are used. The wheel shaft rotates in heavy-duty, double-row ball bearings, permanently lubricated and sealed against entry of dirt and abrasive particles. The spindle drive is through a V-belt from a reversible motor located in the base of the grinder. Ample tool rest tables are adjustable to required tool sharpening angles, and may also be adjusted to compensate for wheel wear.

Sheet metal guards attached to the table brackets, and moving with them, prevent tools from dropping into the wheel recesses. A pressure coolant system, having its own tank and pump, is provided. Coolant at each wheel is controlled by an individual valve. Ex-Cell-O Corp., Dept. JS, 1200 Oakman Blvd., Detroit 32, Mich.

Use ACTION Card, opposite page 64. Circle No. 128

Precision drilling machine

The Taylor Dynamometer & Machine Co., Dept. RB, 6411 River Parkway, Milwaukee, Wis., has added a new model to its line of Hi-Eff sensitive drilling machines, the Series C, Model 64.

The combined runout of spindle and chuck is held to .0005" or better, with variable spindle speeds from 800 rpm to 10,000 rpm. The range of holes that can be drilled are from .001" to .125".

Use ACTION Card, opposite page 64. Circle No. 129

Miccro Spray

LAY-OUT DYE

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

•

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

Write for circular on company letterhead

MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave., Detroit 13, Mich.

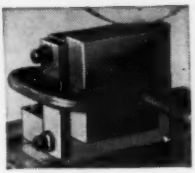
Circle No. 384 on Card, Opposite Page 65

LASSY MASTER V-BLOCK ANGLE PLATES

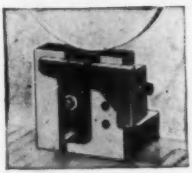
Proven Time Savers!

A Master tool of versatility for every day use in . . . inspection and machining operations.

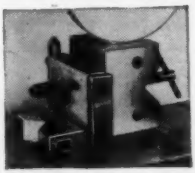
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



LASSY MASTER Angle Plate also provides a master setup for regrinding of worn or inaccurate Angle Plates.

The LASSY MASTER Angle Plate is an indispensable tool precisely accurate and dependable.

WRITE FOR ILLUSTRATED LITERATURE

LASSY TOOL COMPANY

PLAINVILLE, CONN.

Circle No. 385 on Car d,Opposite Page 65

Gaging fixture checks shoulder squareness

A gaging fixture which checks shoulder squareness relative to the centerline of product threads uses interchangeable roll holding plates and interchangeable gaging rolls to provide an inspection range from ¼" to 1½" thread diameter. Inherent accuracy is approximately .0002" total indicator reading, at 1½" diameter.

Used in conjunction with an ordinary dial indicator, the fixture consists basically of a gaging head mounted on a precision aligned spindle. Special ball thrust bearings insure squareness. In operation, a lever arm is actuated, opening the gaging rolls carried on the gaging head. The product thread is placed on the rolls and the arm is released. Pratt & Whitney Co., Inc., Dept. MG, West Hartford, Conn.

Use ACTION Card, opposite page 64. Circle No. 130

Pair of Profitmakers...

these SCHAUER SPEED LATHES

Polishing conical brass adapter with Schauer Type NAO Speed Lathe.

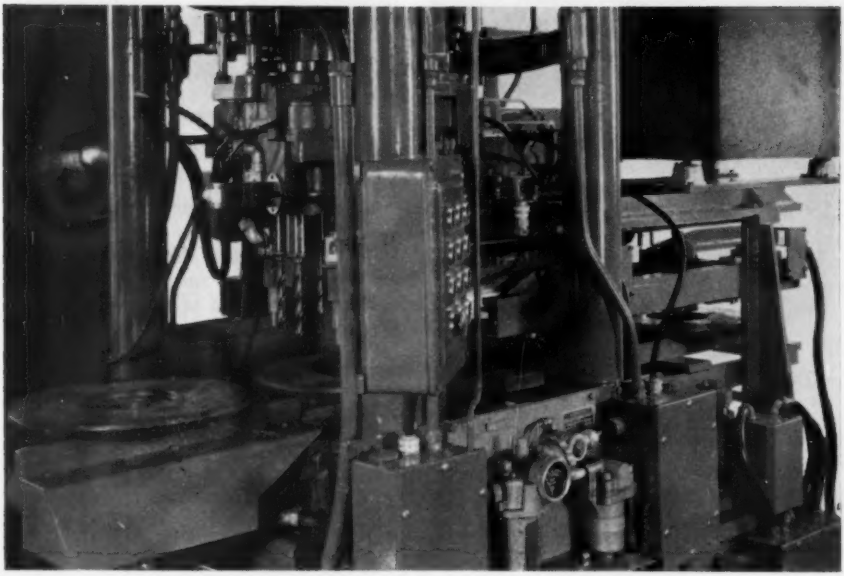
These versatile, low-cost machines handle an almost unlimited variety of work—deburring, lapping, filing, trimming, polishing, etc. Thousands in use, *profitably!* Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

SCHAUER MANUFACTURING CORP.

4502 Alpine Ave. • Cincinnati 36, Ohio

Circle No. 386 on Card, Opposite Page 65

Automatic Balancing Machine



Developed recently for an automobile engine plant, a new automatic machine is designed to balance flywheels at the rate of 125 pieces per hour. It performs the complete balance cycle—location, measurement, and correction—without an operator.

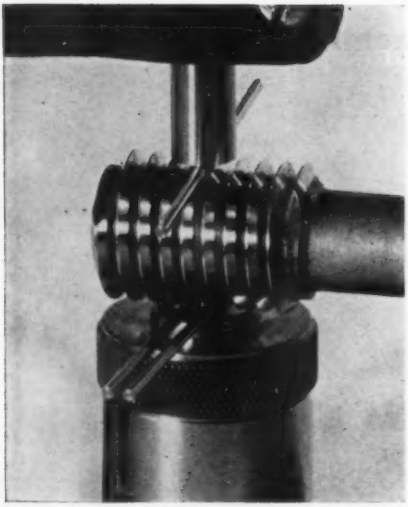
The fundamental design of the machine permits it to find suitable correction areas in work where the removal of material for balance may be limited to certain locations. Micro-Poise Engineering and Sales Co., Dept. JS, 14851 Grand River Ave., Detroit 27, Mich.

Use ACTION Card, opposite page 64. Circle No. 131

Calibrated measuring wires

The Van Keuren Co., Dept. JP, 176 Waltham St., Watertown, Mass., has announced that all of their thread measuring wire for standard 60° uni-

Circle No. 387 on Card, Opposite Page 65



fied and American threads will be calibrated in addition to being furnished within .00002" of nominal best size. The individual calibration of each set of wires will permit the more exact computation of the wire constant which is printed on the label accompanying the wires. In many cases considerably more accurate pitch diameter measurements will result.

Use ACTION Card, opposite page 64. Circle No. 132

Flash trimmer with automatic work ejector

This 8" stroke hydraulic flash trimmer trims the inside and outside of butt welded rings from 5" diameter up and having ⅛" maximum thickness. Automatic ejection of the work is provided by twin arms operated hydraulically. When the draw-cut trimming cycle is complete the twin arms automatically eject the ring from the machine.

Three tool holders and cutting tools are provided in each ram. The cutting cycle is automatic through a floor foot type starting switch. Alternating cur-

WATERTIGHT!

OVER 5,100,000 CONTACTS UNDER WATER!

(Switch Reversing Actuating Motor)

LOXSWITCH Heavy Duty LIMIT SWITCHES

FREE 4 page folder describing 7 models, 19 contact arrangements.

R. B. DENISON MFG. CO.

102 St. Clair Ave. N.W. • Cleveland 13, Ohio

Circle No. 388 on Card, Opposite Page 65

MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"
O.D. 3/32" to 13/64"
Lengths ¼" to ¾"
.0002 Tolerance on I.D., O.D., and Concentricity

WRITE FOR CATALOG

PREBCO BUSHING CO.

14702 East Arrow Highway
Baldwin Park, California

Circle No. 389 on Card, Opposite Page 65

The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOLPROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS, Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 85

THE PYROMETER INSTRUMENT CO.
New Plant and Laboratory, Bergenfield 3, N. J.

Circle No. 390 on Card, Opposite Page 65

DOUBLE DISC GRINDING Facilities

Our Double Disc Grinders
Speed Production
and save $$$ by grinding 2 surfaces Flat & Parallel in 1 operation. *TOLERANCES IN LOW TENTHS.* Piece parts may be rectangular or round flat discs, or flimsy castings in any materials.

If so desired, your purchase order buys in addition, *complete machine shop facilities* to manufacture parts to your blueprints or complete assemblies to your specifications.

We service customers from Maine to California

PRECISION DISC GRINDING CORP.

57 MESEROLE AVENUE
BROOKLYN 22, NEW YORK
EVergreen 3-3720

WRITE for BROCHURE

Circle No. 391 on Card, Opposite Page 65

METAL PRODUCTION CAPACITY AVAILABLE

For long or short production runs of large or small parts, tools, jigs or fixtures. Also dies, gages, special machinery.

Keller Profilometer-Duplicator, 16"x24"
Presses up to 450-ton, 48"x48", Triple Action
Planers up to 20-foot Stroke, 72"x72"
Radial Drill Presses up to 8-foot, 19" column
Lathes up to 158" c.c., 57½" gap, 40" swing
Boring Mills up to 120" Bed, 90" Horizontal, 60" Vertical

Also Milling Machines, Grinders, etc. Complete production facilities—experienced machinists.

INQUIRIES INVITED ON CONTRACT BASIS OR INDIVIDUAL QUOTATION

PIVOT PUNCH & DIE CORPORATION
Dept. MT
NORTH TONAWANDA, N. Y.
Phone JA. 1200

Circle No. 392 on Card, Opposite Page 65

PORTABLE ELEVATING TABLE

Saves TIME and LABOR

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

Our major services — Designing and Building — Dies, Jigs, Fixtures and Special Machinery.

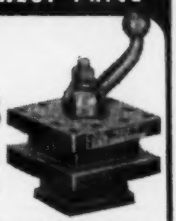
SEND TODAY FOR ILLUSTRATED CATALOG No. 2

THE MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Circle No. 393 on Card, Opposite Page 65

MANHATTAN'S MIRACLES!
TOP VALUE — LOWEST PRICE

TURRET TOOLPOSTS



SAVE 33⅓%

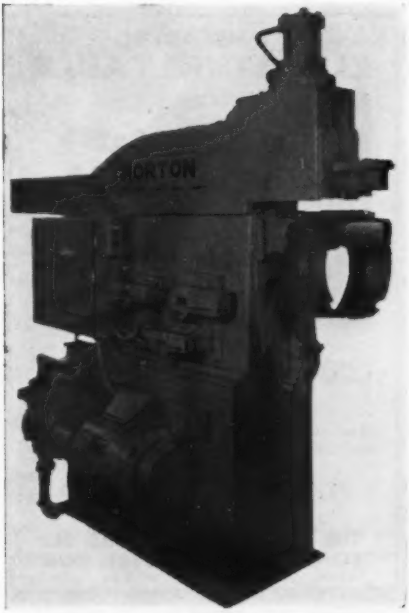
12 position indexing • Machineable base Block can mount 4 different tools • 3 working positions • Precision made in West. Germany

Model	Tool Block	Tool Range	Price
2½"	2½" x 1⅜"	¼" x ⅜"	$16.00
3½"	3½" x 1¾"	⅜" x ½"	$24.00

For tremendous savings, write for circular listing sensational bargains.

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N. Y.
Telephone: CAnal 6-4992

Circle No. 394 on Card, Opposite Page 65



rent 10 hp motor and control equipment is provided for furnishing the hydraulic operations. Morton Mfg. Co., Dept. JS, Muskegon Heights, Mich.

Use ACTION Card, opposite page 64. Circle No. 133

Table extensions provide outboard support

Setups for straight or angle cuts in metal plate or flat stock are made in a few minutes with a new table accessory for DoAll Contour-matic sawing machines. This accessory consists of T-shaped bars designed to fit the T-slots in the hydraulically actuated tables.

The bars can be slid in or out of the table slots independently, and locked in any position with an Allen wrench. Bars can be adjusted to provide outboard support for stock longer than the capacity of the table.

Studs on the ends of the bars serve as stops. Once the bars are set, any number of similar pieces can be cut

HAND KNOBS

6 Sizes Cast-Iron

Tapped, Reamed or Blank

Hex-shaped hub for extra tightening

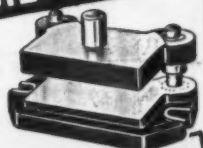
Write for catalog

TIETZMANN TOOL CORPORATION

DEPT. H-K ENGLEWOOD, OHIO

Circle No. 395 on Card, Opposite Page 65

DANNEMAN *Precision* **DIE-SETS**



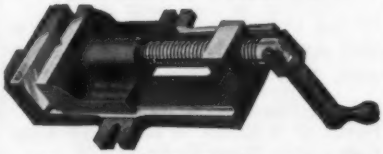
Precision-Bored on Master Plates

DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG ON REQUEST

Circle No. 396 on Card, Opposite Page 65

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

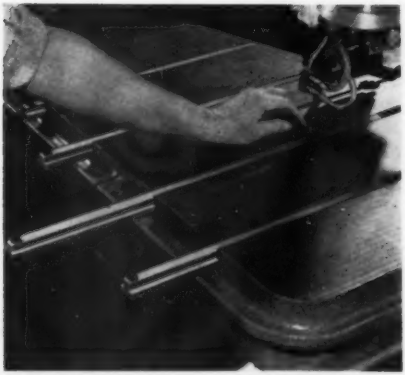
Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
124 GRANT STREET
CAMBRIDGE SPRINGS, PA.

Circle No. 397 on Card, Opposite Page 65



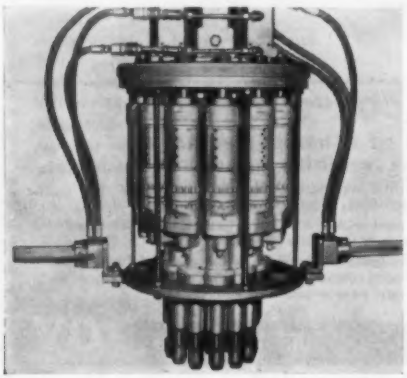
rapidly. Unload and load time is negligible because clamps and hold downs are not required. The DoAll Co., Dept. RB, Des Plaines, Ill.

Use ACTION Card, opposite page 64. Circle No. 134

Multiple nutsetter

This twelve-unit multiple nutsetter is designed to tighten simultaneously a dozen nuts to predetermined torque. A principal feature of the air tool is the use of offset spindle nutsetters, arranged in a compact 6-⅝" working circle, to meet the requirements of a motor car manufacturer for setting different housing nuts. Thor Power Tool Co., Dept. RB, Aurora, Ill.

Use ACTION Card, opposite page 64. Circle No. 135



"Jorgensen" and "Pony" CLAMPS

Ask Your Supplier

send for free 32-page catalog

the clamp folks / ADJUSTABLE CLAMP CO.
403 N. Ashland, Chicago 22, Ill.

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SAVE 90% CHECKING TIME

When Building Dies

This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.

Tietzmann Tool Corp.
D.C. 1 Englewood, Ohio

Circle No. 399 on Card, Opposite Page 65

CAM MILLING

Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.
23-22 49th Road Long Island City 1, N. Y.

Circle No. 400 on Card, Opposite Page 65

JIG BORING
and
Large Precision Machining
Done to your specifications
WE HAVE 21 JIG BORERS
KIDDE PRECISION TOOL CORP.
25 LOCUST AVE. ROSELAND, N.J.

Circle No. 401 on Card, Opposite Page 65

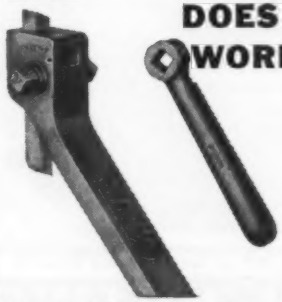
Tapper mounts vertically or horizontally

The 101 Series Kaufman tapper can be mounted vertically or horizontally, arranged in combinations to do two or more operations, or mounted horizontal or angular in combination with vertical heads to do various operations simultaneously.

A sensitive torque control, which signals overload, stops the machine automatically to avoid tap breakage. Spindle speeds range from 35 to 785 rpm. Kaufman Mfg. Co., Dept. RB, Manitowoc, Wis.

Use ACTION Card, opposite page 64. Circle No. 136

ONE TOOL HOLDER DOES THE WORK OF TEN



ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . .

Bit sizes: ¼", 5/16", ⅜", 7/16", ½", ⅝"

Furnished with Cobalt Bits

ACME TOOL CO.

71 W. Broadway New York 7, N.Y.

Circle No. 402 on Card, Opposite Page 65

SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 3/32" to ½", by 1/64"—plus handy 17/64" size. Length 4⅞". ONLY $16.80.

Single sizes available

R. L. SPELLMAN CO. — URBANA, OHIO

Circle No. 403 on Card, Opposite Page 65

This tube reamer type gun drill is particularly adaptable to valve guide hole drilling and other work where hole size, roundness and straightness must be held to strict specifications. The drill, two-thirds cylindrical in shape, is an end cutting tool with a single cutting edge. Oil is forced through the shank, right down to cutting edge. Eldorado Tool and Mfg. Co., 342 Boston Post Rd., Milford, Conn.

Use ACTION Card, opposite page 64. Circle No. 137

Threaded inserts for plastics, rubber, die castings and potting compounds have been announced as standard stock items by Standard Insert Co., Dept. KE, 12270 Montague St., Pacoima, Calif. Inserts are molded directly into the product, and require no secondary operations for inserting or locking. Inserts are knurled to prevent rotation; added strength against pullout is obtained by two relief bands.

Use ACTION Card, opposite page 64. Circle No. 138

Plain angle wheel dresser, the Angle Master, is claimed to be 100% dustproof. All dresser parts are precision ground. Sealed ball bearings are used to provide a rugged and dependable tool. Mehanite base permits drilling and tapping of holes when needed for quick setups on cylindrical grinders. Dressers with diamond point horizontal to center of spindle. J & S Tool Co., Inc., Dorsa Ave., Livingston, N.J.

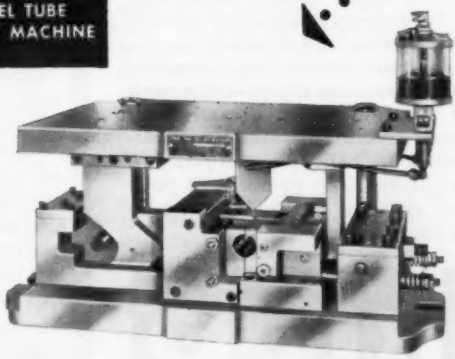
Use ACTION Card, opposite page 64. Circle No. 139

Cuts Tubing to Accurate Lengths in
SPLIT SECOND TIME!

VOGEL TUBE CUT-OFF MACHINE

LENGTHS of ½ inch or more are accurately cut to ± .010" with each stroke of press—actually less than ½ of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 1-2 accommodates tubing up to ½" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with ⅛" wall.



PATENTED

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

VOGEL TOOL AND DIE CORPORATION
1825 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

Circle No. 404 on Card, Opposite Page 65

HIGHER SPEEDS!
FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

Weight 12 ounces, length 6¾ inches, chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.
207 Waubesa St., Madison 10, Wis., U. S. A.

Circle No. 405 on Card, Opposite Page 65

Two bores in two planes checked simultaneously

A problem on rocker arms involving parallelism of two bores in two planes for two different size workpieces has been solved by a dual Dimensionair air gage manufactured by Federal Products Corp., Dept. DR, 1144 Eddy St., Providence, R.I.

When checking parallelism between bores, it is necessary to establish a common axis for the two bores. To accomplish this, expanding precision mandrels are placed in each bore and in turn rest in V-blocks. The gaging contacts are mounted on frictionless motion transfer units which relay the movement of the sensitive contacts to Federal AirProbes, universal air gaging spindles. One contact checks the position of the front of the reference mandrel and another locates on the underside to check in the other plane. A glance at the pointers answers the question, are the bores parallel in both planes?

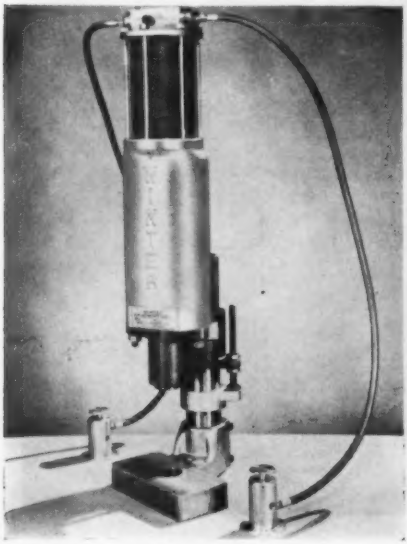
Use ACTION Card, opposite page 64. Circle No. 140

Controlled power safety press

An improved controlled power safety press, Model RR-7A, with several new features, has been announced by Winter Products, Inc., Dept. MG, Box 3112 Baron Station, Bridgeport, Conn. It is a bench-mounted unit for light staking, forming, and other secondary-press work, and is capable of delivering an accurately controlled impact from 0 to 12,000 lb. or a squeeze up to 12-times air-line pressure.

The cast aluminum base has a two inch diameter relief hole. Also, a combination elevating mechanism and key raises and lowers the head of the press while maintaining the angular position of the press head on the column. An accurate method of keying the ram in the ram housing has been provided.

A new control system has also been incorporated, consisting of a double pilot four-way valve mounted on the air cylinder head. This valve operates the press on the down stroke and a new type air blow-off system on the up stroke of the press. The piloted four-



FOR LOWER COST
HIGHER QUALITY
WESTBURY
VERTICAL MILLS
Models 1-S and 1-R

Hardened and ground high-speed ball bearing spindle—5" quill travel, micrometer depth stop—Three feeds, .0016; .003; .005—Rapid spindle change over, 8 speeds (80-2713) — Dovetailed over-arm (1-S)—Round over-arm, (1-R)—Precision angle setting control — Rigidly mounted table — 42¾" x 9 1/16" — 30" longitudinal range, 10" transverse, 16" vertical—Positive locks—Motor, 1.5 H.P. — Weight, 2200 lbs. Available with duplicating attachment Mod. FR for hydraulic precision reproduction of molds, patterns, and templates in any material.

Write, wire or phone for descriptive literature

MASERATI

Distributors in principal cities

Maserati Corporation of America
Westbury, L.I., N.Y.

Circle No. 406 on Card, Opposite Page 65

Balancing Tools for a Wide Range of Work

Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 470.

SUNDSTRAND

SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.

Circle No. 407 on Card, Opposite Page 65

way valve is controlled by two hand operated, three-way valves, one normally on and the other normally off. This system provides a safe operating control which can only be operated once for each depression of the two hand valves. Holding down of either of the two hand valves makes the press inoperative until that hand valve is released.

Use ACTION Card, opposite page 64. Circle No. 141

Nonflammable solvent

Vinsol, an industrial solvent that is reputed to have cleaning properties closely resembling carbon tetrachloride, but up to 20 times less toxicity, can be used with safety for virtually all applications, including those in confined areas. It is nonflammable, which eliminates danger of fire or explosion when

used near open flames or next to grinding equipment.

Solvent is recommended for removing oil, grease, wax and tars from hand tools, sheet metal, machine tools and components, tubing and other metal products. For dip cleaning, it is packaged in a portable 5-gallon container fitted with a metal tray that can be raised or lowered at will. Vinsol is also available in 1-gallon cans and 55-gallon drums. Speco, Inc., Dept. RH, 7308 Associate Ave., Cleveland 9, Ohio.

Use ACTION Card, opposite page 64. Circle No. 142

Compensating power chucks

The Skinner Chuck Company, Dept. MG, New Britain, Conn., has announced a line of three-jaw compensating power chucks, Series 13100-A, in 8", 10", 12" and 15" rated sizes. They are for direct mounting on American Standard Types A-1, A-2, B-1 and B-2 flanged spindle noses. These chucks have forged steel bodies, and are used to drive work on centers when high speed, heavy duty cuts are required. The high speed tool steel center fits a standard Morse taper hole in the centerplate.

The 8" chuck features 1/16" compensation, and the 10", 12" and 15" chucks have ⅛" compensation, per jaw, which

DO YOU MAKE?

— Plastic, Rubber or Glass Molds
— Forging or Die Cast Dies
— Contoured Parts for Ordnance or Aircraft

The REGENT
Fluid-Motion
DUPLICATOR TABLE

REGENT

39 out of 40 plants who purchased Regent Duplicator Table on a 15-day trial, sold themselves on its faithful performance.

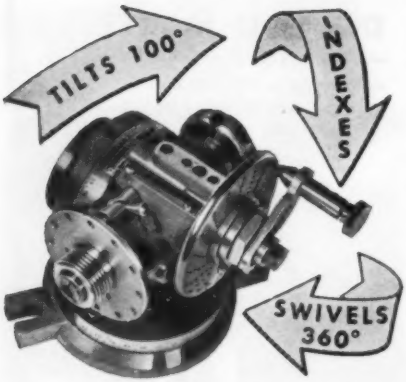
MOUNTS ON ANY BRIDGEPORT MILL

Capacity 6" x 6" — 1 to 1 ratio with master. 2 or 3 dimensional with greatest accuracy. Single lever table control. Table "floats" on precision balls.

SOLD ON 15 DAY TRIAL BASIS

J. M. KALINS & CO.
1577 Railroad Ave., Bridgeport 5, Conn.

Circle No. 408 on Card, Opposite Page 65



FOR FASTER PRODUCTION

THE ELLIS

DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

NICHOLS MORRIS CORPORATION

76-G MAMARONECK AVE.

WHITE PLAINS, N. Y.

Circle No. 409 on Card, Opposite Page 65

is sufficient for gripping castings, forgings and other rough materials which have normal variations in size and errors in centering.

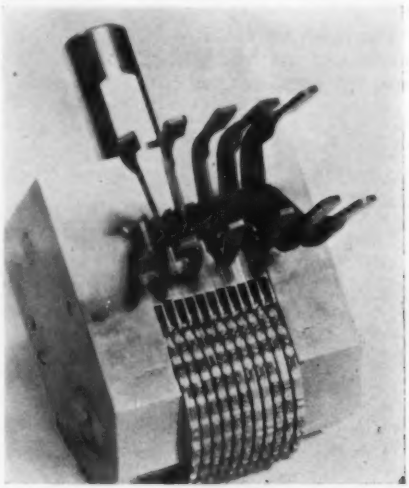
The compensating action is achieved through 3 levers and a floating rocker. When power is applied, the draw bar pulls the rocker which actuates the three levers and three jaws. Equal pressure to all jaws is assured, regardless of their gripping position on even or uneven work.

Use ACTION Card, opposite page 64. Circle No. 143

Nameplate numbering head

The Model 428 numbering head, designed primarily for stamping nameplates with data which is variable from plate to plate, or for short runs of the same number setup, is available in 1/16", 3/32" and ⅛" character size. The number of wheels is optional. All wheels are stamped with indicating characters to give a direct reading of the setup in order to reduce operator's errors.

Levers are provided to index wheels individually. Depressing and releasing a lever advances the corresponding wheel one division ahead. Each wheel



may be engraved with the entire alphabet and blank or characters as required. The tool is ordinarily used in a press in a straight stamping operation and can be equipped with proper shank diameter to suit existing equipment. It can also be used for roll-marking of round parts in a general purpose marking machine where the usual dovetail shank would be supplied. Noble & Westbrook Mfg. Co., Dept. MG, East Hartford, Conn.

Use ACTION Card, opposite page 64. Circle No. 144

Hydraulically operated table

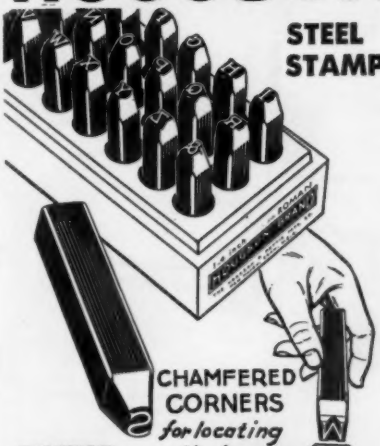
A hydraulically operated utility table of 1000 lb. capacity has been developed by Rack Hydraulic Equipment Corp., 151 Sixth St., Connellsville, Pa. The table top, which is 28" above floor level and has an elevation of 16", is elevated and lowered by means of a foot treadle. Table dimensions are 20" x26". An overload by-pass valve provides safe operation and prevents damage to the hydraulic unit.

Use ACTION Card, opposite page 64. Circle No. 145

TO BE SURE OF *QUALITY*
Remember the Name

HOGGSON

STEEL STAMPS



CHAMFERED CORNERS *for locating the base*

FINEST STEEL *long life*

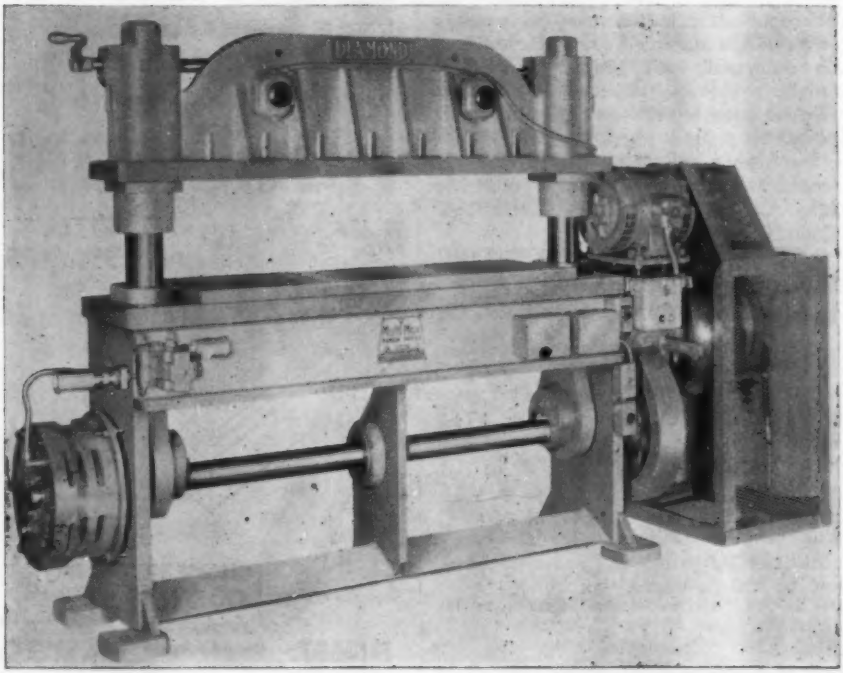
ALSO IN REVERSE FOR MOLDS & DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.
141H Brewery St. New Haven 7, Conn.

Circle No. 410 on Card, Opposite Page 65

Punch Press has Cool-Running Motor



An air clutch, air brake, and low temperature-rise motor that permit closer control of punch press operations and add years of service are available on a new line of Multi-Max punch presses.

The air clutch lets the operator set dies by inching the ram into any predetermined position, where it is held by the automatic application of an air brake synchronized with the clutch. The air brake is free from drag, reducing heating and power consumption.

A cool-running electric motor provides controlled power for the press. Motor has an extra, turbine-type fan on the shaft. Acec Electric Corp., 40 East 49th St., New York 17, N.Y.

Use ACTION Card, opposite page 64. Circle No. 148

Ram Type Universal Turret Lathe

The Gisholt Masterline ram type universal turret lathe is available in three basic models. The No. 3 lathe has a 1-½" round bar stock capacity; No. 4, a round bar stock capacity of 2"; No. 5, either 2-½" or 4-½" round bar stock. The machine can be furnished with a Lynn hydraulic drive unit to provide completely automatic operation.

A new bed design, with extra heavy webbing and cross supports, provides maximum rigidity and assures freedom from vibration. The bedways have been widened to provide a better base for

ANGLE VISES

No. 000—2½" $14.80

No. 23B—3" $29.95

No. 24B—4" $39.95

All with SWIVEL BASE

PALMGREN

for MILLING MACHINES, DRILL PRESSES, GRINDERS, SHAPERS . . .

64 different models and types of vises, rotary tables, milling attachments, and other machine tool accessories.

Write for catalog No. 204

MILLING MACHINE VISES

40B—4" $79.95

60B—6" $99.95

Also without swivel base

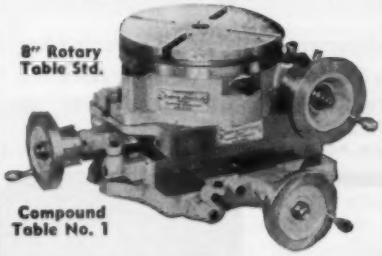
CHICAGO TOOL AND ENGINEERING CO., 8384 South Chicago Avenue, Chicago 17, Illinois

Circle No. 411 on Card, Opposite Page 65

The STEVENS Line

SINCE 1925

Introducing NEW series



8" Rotary Table Std.

Compound Table No. 1

ROTARY TABLES, 5-7½-8-12-15-18-24" sizes both standard & dial indexing types
ADJUSTABLE TILTING TABLES, #0 - - 2
COMPONUD TABLES, #1 - 2
ROTARY-COMPOUND TABLES, #1 - 1½ - 2
INDEX CENTERS - multiple spindle
ROTARY-COMPOUND TABLES, #1 - 1½ - 2

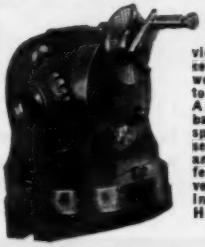
See your dealer or write for bulletins

The JOHN B. STEVENS Company

SOMERSVILLE, CONN.

Circle No. 412 on Card, Opposite Page 65

UNIVERSAL DIVIDING HEADS



Precision built to meet every requirement, Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast.
A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

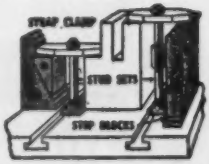
Write for 8 page catalog giving complete details, etc.

10" - 12" Universal Right or Left Hand Dividing Heads with or without Direct Indexing.

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. ▪ Cincinnati 9, Ohio

Circle No. 413 on Card, Opposite Page 65



SURE GRIP STEP BLOCKS

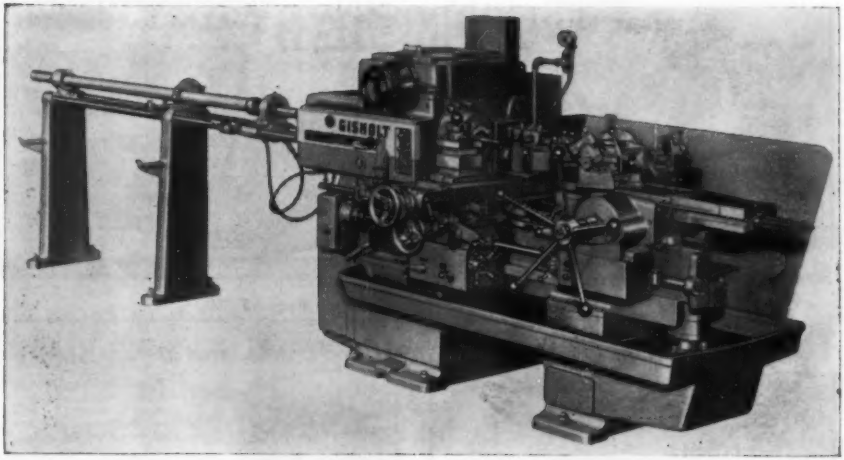
Clamping tools of all types

Write for free tracing templates

TIETZMANN TOOL CORP.

Dept. C. T. **Englewood, Ohio**

Circle No. 414 on Card, Opposite Page 65



the turret saddle and for the cross slide carriage. The swing has been increased to permit handling a greater range of work. One piece bedways are standard, with all surfaces used for bearing, alignment, gibbing and clamping having a hardness rating of 64-66 Rockwell C. Gisholt Machine Co., Madison 10, Wis.

Use ACTION Card, opposite page 64. Circle No. 147

Commander

TAPPER

- **Wider Range . . . 1 Tapper Handles No. 0 to ¾" Taps**
- **Automatic Tap Protection**
- **Furnished to fit ANY Drill Press**

Commander—"The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line.

Any operator does precision tapping with a *Commander* TAPPER

COMMANDER MFG. CO.

4227 W. KINZIE STREET CHICAGO 24, ILL.

Product of Commander . . . Builder of Production Tools

Product of *Commander* . . . Builder of the *Multi-Drill*

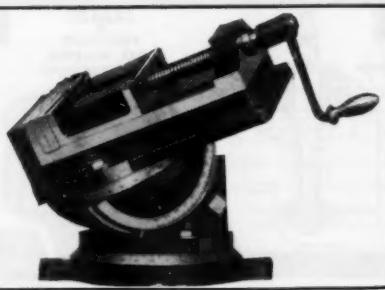
Circle No. 413 on Card, Opposite Page 65

SET UP COMPOUND ANGLES INSTANTLY!

Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

DONOVAN MFG. CO.
80 Batterymarch St. Boston 10, Mass.



Circle No. 416 on Card, Opposite Page 65

New type of positioning table for production drilling operations reproduces any pattern of holes within its capacity. Table consists essentially of a movable portion which rides freely over a predetermined area on ball thrust bearings, a removable hole location plate which carries the hole pattern to be reproduced, locking mechanism which aligns table with machine spindle. Howe & Fant, Inc., East Norwalk, Conn.

Use ACTION Card, opposite page 64. Circle No. 148

Hutte adjustable bore gages are now hard chrome plated. Easily and quickly set to cover any combination of tolerances within range. Fifteen standard sizes cover a range from .995 to 6.005. One end of gage is set to the "go" tolerance and the other to the "no go" tolerance. When hole is within tolerance the go end rocks freely and no go end binds. Maxwell Co., Dept. RH, Macedonia, O.

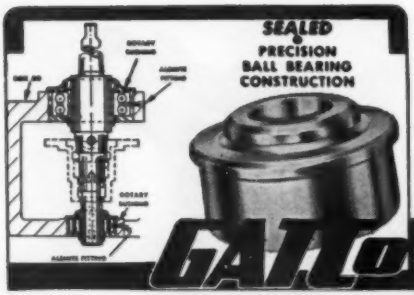
Use ACTION Card, opposite page 64. Circle No. 149

Better-Hold chucks for use with shank-type cutting tools applies a powerful centering fit to tools simply by twisting the threaded lock-and-eject nut. This draws a split collet with tapered OD into compression against a mating taper on the ID of the chuck. High holding power results from the powerful collet action produced in the tool by the mating tapers. Scully-Jones and Co., 1901 Rockwell, Chicago.

Use ACTION Card, opposite page 64. Circle No. 150

DYKEM
STEEL BLUE
Stops Losses
making Dies and Templates
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
THE DYKEM COMPANY
2301G North 11th St. • St. Louis 6, Mo.
DYKEM STEEL BLUE
With DYKEM Steel Blue
Without DYKEM Steel Blue

Circle No. 417 on Card, Opposite Page 65



ROTARY BUSHINGS

FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

ROTARY BUSHINGS

4238 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472

Circle No. 418 on Card, Opposite Page 65

Multi-purpose aluminum valve, Comet II, is fast operating, compact and lightweight. Provides more than 100 model variations for a wide range of air and oil pressure applications. Valve completes a cycle within 0.033 seconds. It is engineered and built to tolerances of .0001", and is available with ¼ or ⅜ inch pipe tap. Ross Operating Valve Co., Dept. JS, 120 E. Golden Gate Ave., Detroit 3.

Use ACTION Card opposite page 64. Circle No. 151.

Perforating unit, Unipunch Series B, is a two-piece punch that permits punch head to be used and reused on inexpensive punch bodies. Economical snap-on stripper eliminates individual guides for each size punch tip. Die retainer block permits easy, quick interchanging of buttons without removing unit or disturbing setup. Punch Products Corp., Dept. RH, 3800 Highland Ave., Niagara Falls, N.Y.

Use ACTION Card opposite page 64. Circle No. 152.

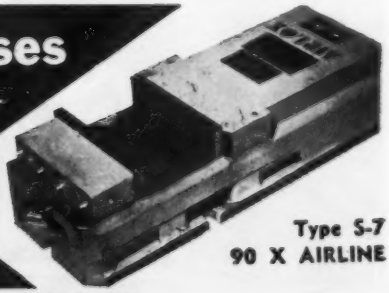
Multi-step setup blocks made of aluminum alloy that will withstand great weight under clamping pressures are being manufactured by Jergens Tool Specialty Co., Dept. RH, 712 E. 163rd St., Cleveland 10, O. Blocks save machine setup time and protect tables from scratches and nicks. Softer than the machine table, blocks actually absorb metal chips. Used for jig borers, boring mills, drill presses, millers.

Use ACTION Card opposite page 64. Circle No. 153.

AIRLOX air vises

— PARTICULARLY FOR MILLING —
AIR OPERATED WEDGE WITH LEVERS
DELIVERS GRIP OF 50 TO 200
X AIRLINE

PRODUCTION DEVICES, INC.
WHITEHALL, N.Y. Tel. 40



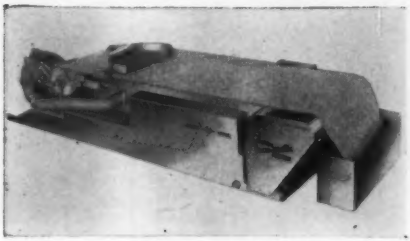
Type S-7
90 X AIRLINE

Circle No. 419 on Card, Opposite Page 65

Improved Filtration Unit

The Hoffman Vac-40 Vacumatic filter is completely automatic and self-cleaning. Designed for use on grinders, hones and other machine tools where continuous and effective filtration of coolants is desired, it employs vacuum rather than gravity and is capable of delivering very high flow rates in sustained operation.

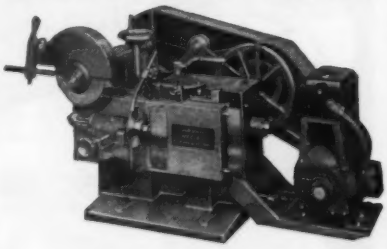
Using a specially fabricated paper as its filtration medium, the unit delivers dry sludge with no coolant carry-over, thus minimizing coolant loss. The paper is supported by an endless fabric belt which in turn is carried on a wire mesh belt which revolves continuously on a chain-sprocket drive. A large vacuum chamber is located directly beneath this belt, and the vacuum tends to hold the paper tightly against the supporting screen.



Dirty coolant flows by gravity from a baffled distributor on to the filter paper directly over the vacuum chamber. Coolant is uniformly distributed over the entire width of the paper surface. Owing to pressure differential created by the vacuum, the coolant is filtered rapidly thrcugh the paper into the vacuum chamber. The clean coolant drains into the clean coolant sump, and is then delivered back to the machine tool by the supply pump. U. S. Hoffman Machinery Corp., 103 Fourth Ave., New York 3, N.Y.

Use ACTION Card, opposite page 64. Circle No. 154

Wardwell Saw Grinder, "35T"



Sharpens Metal Saws in Gangs . . . Saves Money

Sharpens up to 115 saws .015" thick at one time, better than new. Includes slitting and screw slotting saws, and milling cutters up to 5½" diameter.

Completely automatic. All you do is start the machine. It does the rest.

"35T" saves money for you by greatly increasing saw life. You owe it to yourself to investigate this remarkable machine.

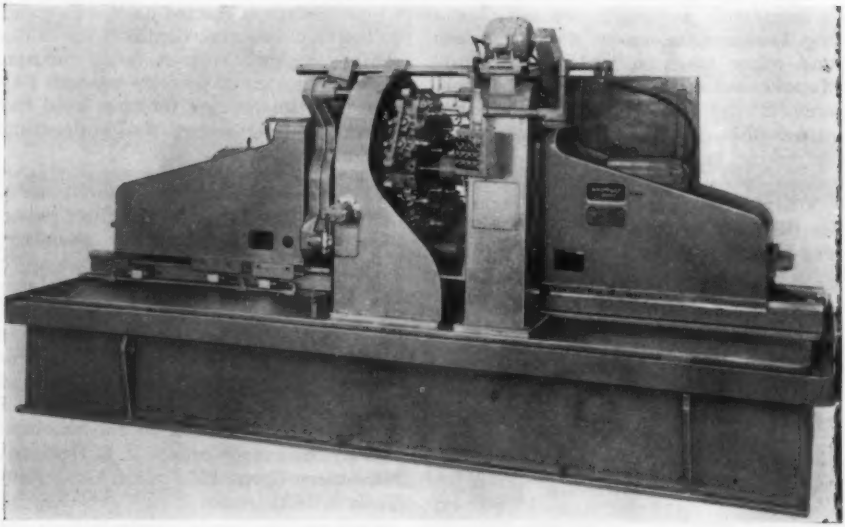
Write for Bulletin 35T

WARDWELL MANUFACTURING CO.
3807 Ridge Road Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

Circle No. 420 on Card, Opposite Page 65

Drilling and Tapping Machine



Cast iron differential bearing caps are drilled, reamed, tapped, chamfered and spotfaced. Rate per hour: 480 pieces.

Parts are placed in a dual loading fixture with equalizing manual clamp on a six station vertical trunnion style dial. Two hydraulic feed units with multiple spindle heads and one lead screw tapping spindle perform the operations. The Hartford Special Machinery Co., 264 Homestead Ave., Hartford 12, Conn.

Use ACTION Card, opposite page 64. Circle No. 155

CAMS

To Your Specifications except Screw Machine Cams

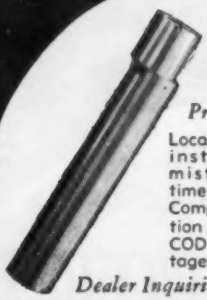
Design Assistance Offered

KIDDE PRECISION TOOL CORP.
25 LOCUST AVE. ROSELAND, N.J.

Circle No. 421 on Card, Opposite Page 65

JUMP EDGE FINDER

Locates edge in one minute within .0005



$2.50 Each

Prepaid orders

Locates edge or step instantly and unmistakably every time within .0005. Complete satisfaction or money back. COD order plus postage.

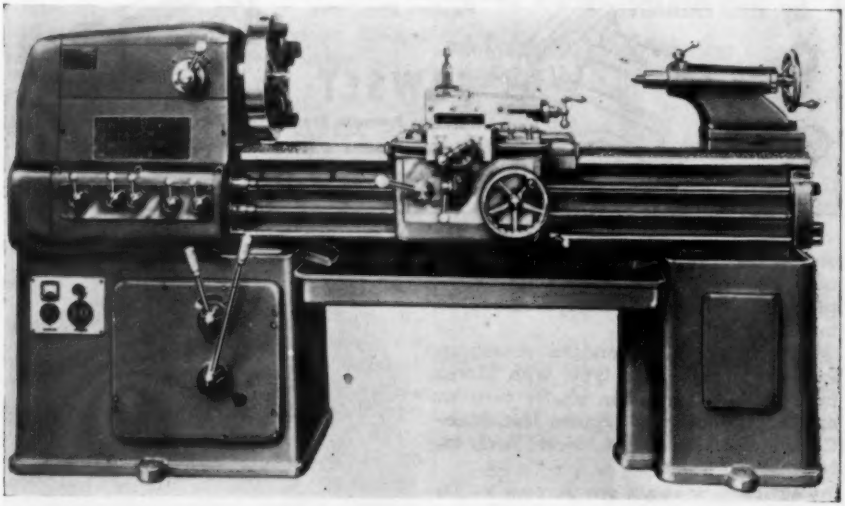
Dealer Inquiries Invited

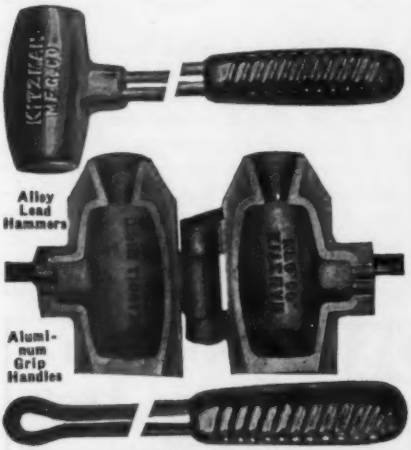
ELISHA PENNIMAN
460 South Main St.
WEST HARTFORD 10, CONN.

Circle No. 422 on Card, Opposite Page 65

Lathes have Spindle Speeds to 1200 RPM

The Imperial Type E series precision geared toolroom lathes, with 12", 14" and 16" swing, claim spindle speeds as high as 1200 rpm. Spindle is hardened





Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

KITZMAN MFG. CO.

15061 Hartwell Ave. Detroit 27, Mich.

Circle No. 423 on Card, Opposite Page 65

2 New Tools FOR THE MACHINIST

THREAD TRIANGLES

Will quickly measure all 60° pitch diameters, 4 to 56 pitch, all O.D.'s standard and non-standard. No fancy calculations. Just add a constant to the O.D. Comes complete with chart and case $10.00

POCKET GAGE FOR SURFACE FINISH

With 22 precision surfaces from a 2 micro inch hand lapped finish to a 500 micro inch milled finish. Made to A S A standards. Complete with case $15.00

At Your Mill Supply Jobber.

H.B. Tool Co.

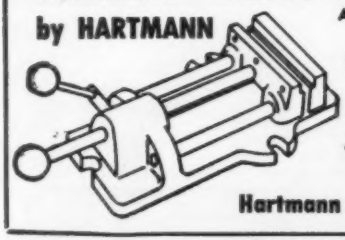
Bigelow 8-1045

24 Austin St. Newark, N. J.

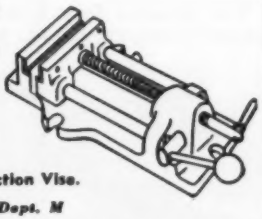
Circle No. 424 on Card, Opposite Page 65

INSTANT ACTION **RAPIDSET**

by HARTMANN



All Purpose Tool Room and Machine Shop Vises.



The

JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

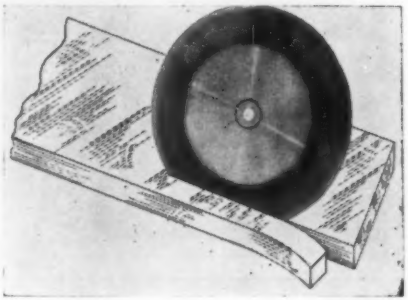
Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin

Circle No. 425 on Card, Opposite Page 65

and ground, machined from a chrome-nickel-steel forging. It is amply supported by roller bearings designed to take up thrust loads.

Spindle nose is standard American long taper key-drive type, with Morse taper. All transmission shafts turn in anti-friction bearings. Aaron Machinery Co. Inc., 45 Crosby St., New York 12, N.Y.

Use ACTION Card, opposite page 64. Circle No. 156



Longer wear from skiving knives

This disc-like skiving knife is used in the rubber industry to slice strips of rubber into designated widths. High-alloy steel blades wore excessively when used to cut this abrasive material.

By Flame-Plating these knives with a thin coating of tungsten carbide, their service life was increased 115 times. The knives have a bevel on one side of the blade only. Tungsten carbide is Flame-Plated on the flat, unbeveled side and is used in the as-coated (125 microinches rms) condition or brush finished to 50 microinches rms. As the softer, steel base wears more rapidly than the hard, tungsten carbide coating, a sharp edge is always presented to the material being cut. Linde Air Products Co., a division of Union Carbide and Carbon Corp., Dept. MG, 30 E. 42nd St., New York 17.

Use ACTION Card, opposite page 64. Circle No. 157

ULTRA-CHEX GAGE BLOCKS *for Every Need!*

Supplied in one Superior Accuracy

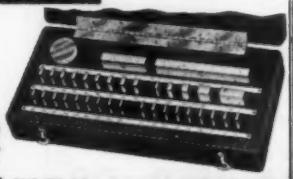
5 MILLIONTHS ± ACCURACY

34 BLOCK SET (shown) $132.50
WITHOUT OPTICAL PARALLEL...

82 BLOCK SET.....$303.00 IN CASE

These sets will supply the needs of any discriminating shop that must work to gage-block precision.

IMMEDIATE DELIVERY



9 Block Set

For Individual Mechanic

$24.75

OPTICAL PARALLEL $6.00 Extra

WRITE FOR ILLUSTRATED FOLDER

GEO. SCHERR CO., INC. 200-MT LAFAYETTE STREET • NEW YORK 12, N. Y.

Circle No. 426 on Card, Opposite Page 65

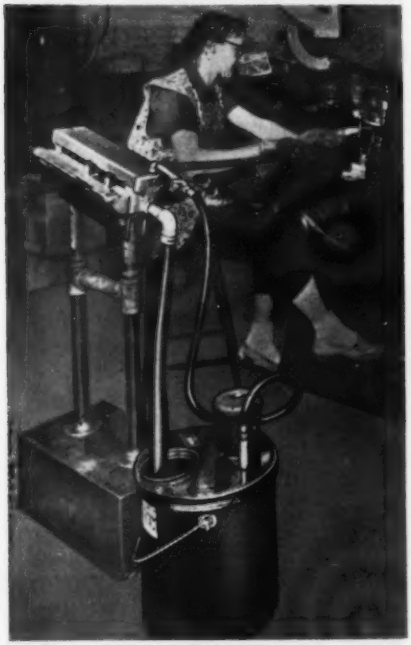
Forced feed stock oiler

A Stocklube system with 5 gal. tank and 1 gpm gear pump has been added to the Graymills line. Circulating pump discharges lubricant through manifold to coat top and bottom of stock. Excess oil is rolled off and recirculated after screening.

Oil is confined within the housing. The metal is both lubricated and cleaned. Loose dirt and rust are flushed off by a flood of oil. The constant circulation is especially advantageous where soluble oils are used, because the emulsion is kept well mixed. Maximum thickness of stock is 3/16". Oil leveling rollers are of smooth steel.

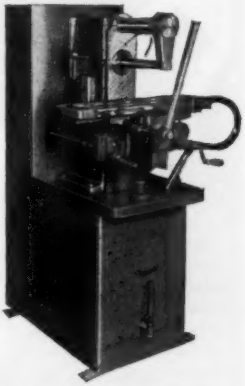
The new Models R6-4-25 and R12-4-25 are for light bodied oils. Heads are available in two sizes, for maximum of 6" or 12" stock widths. Graymills Corp., Dept. RB, 3705 N. Lincoln Ave., Chicago 13, Ill.

Use ACTION Card, opposite page 64. Circle No. 158



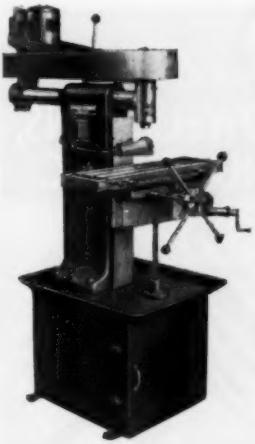
VERSATILITY

HORIZONTAL
Tool Room—
Production



Precision built—Hand scraped and flaked ways • Tapered gib • 5½" x 24" table • power or air to table • Lead screw and rack on the same mill • No. 10 B&S Taper • 1" arbor • 2 HP Motor • 8½"x28" table available.

Price $880 up.



VERTICAL
Production—
Tool Room

8½"x28" Table with air or power feed • Tolerances within .0005" • Exclusive screw type rack w/ Excentro gear adjustment. • Head w/ or w/o quill travel • Screw feed available.

Price $880 up.

CROWNINGSHIELD - HARRIS CO.
711 COUNTRY CLUB RD. EST. 1906
GREENFIELD, MASSACHUSETTS

Circle No. 427 on Card, Opposite Page 65

NIELSEN

Heavy Duty *Live Centers*

Write for catalog on live centers

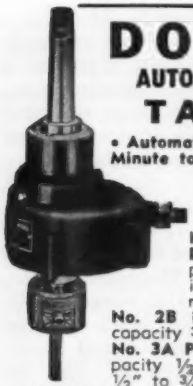
Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

Circle No. 428 on Card, Opposite Page 65

DORMAN

AUTOMATIC REVERSE TAPPERS



- **Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.**
- **WIDE RANGE TAP CAPACITY.**

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/8" in Steel—1/2" in Aluminum.

No. 2B POSITIVE TAPPER — capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER—capacity 1/2" to 1 1/4" in Steel—1/2" to 3/4" Pipe Taps.

No. 4A TAPPER—capacity 3/4" to 2" in Steel including Pipe Taps.

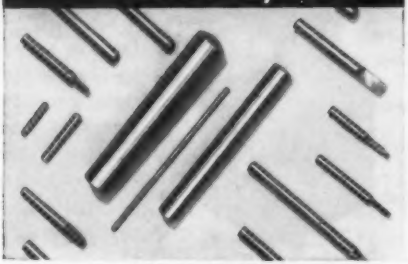
- **PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.**

Priced from **$50.00** Write for Bulletin IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1030 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLING

Circle No. 430 on Card, Opposite Page 65

Peaslee DOWELS, PINS, SHAFTS, ETC.



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

Circle No. 429 on Card, Opposite Page 65

Greenerd

ARBOR PRESSES

For Assembling: Keyway Cutting, Broaching, Piercing, Oil Grooving, Straightening, Forming, Pressing, and many other jobs.

65 Standard styles and sizes.

From 1/4 to 20 tons pressure for manually operated presses.

From 1 1/2 to 75 tons pressure for motor driven hydraulic presses.

Originators of the Arbor Press.

Send for Cat. 40-H

GREENERD ARBOR PRESS CO.
141 CROWN ST. • NASHUA, N.H.

Circle No. 431 on Card, Opposite Page 65

advertisement

Screw Machine Attachment Eliminates Secondary Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically foolproof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.

Model 500-C for automatically marking on outside cylindrical surface of screw machine parts, manufactured by New Method Steel Stamps.

New Method marking units are being used in leading screw machine shops throughout the country to mark millions of parts annually at costs of a fraction of a cent per part.

Illustrated is one of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cut-off slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

For complete information and descriptive bulletin, write New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Circle No. 432 on Card, Opposite Page 65

"Visible" grinder

A bench grinder recently introduced in the U.S. by Carl Hirschmann Co., Inc., Dept. MG, Manhasset, N.Y., permits the operator to see right through the wheel to keep the workpiece surface under constant observation. The new method, called "visible grinding" utilizes a specially designed unbreakable wheel, which when rotated horizontally at 3,600 rpm creates a stroboscopic effect making the wheel appear to be transparent.

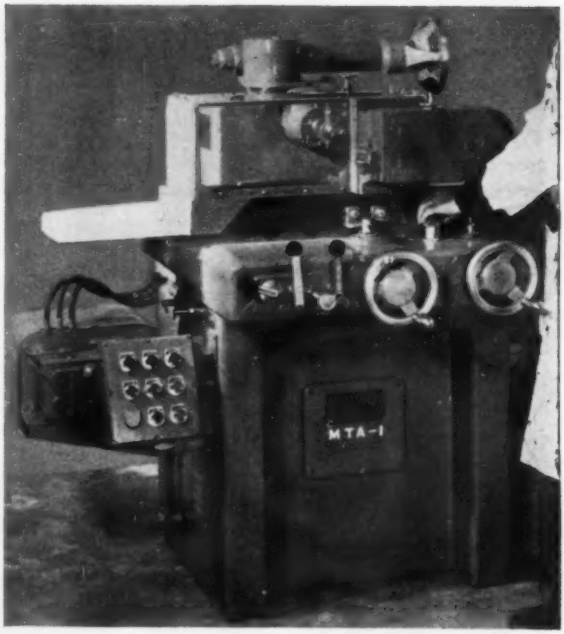
Grinder takes very little bench space (5¼" x 6¼") and knurled thumb nut permits quick wheel changes. Because the wheel rotates in a horizontal plane, sparks and dust are carried away from the operator, reducing the possibility of accidents. The turbine-like slots in the wheel, when in operation, air-cool the wheel and the workpiece, reducing overheating and loss of temper in the piece being ground.

Use ACTION Card, opposite page 64. Circle No. 159

Slicing Machine for Germanium

Raw germanium, prior to cutting, is a crystal, generally in the form of an ingot 4 to 5 inches long and up to 1½ inches in diameter. For most transistors it must first be sliced into thin wafers .010 to .015 inches thick. Where power transistors are the end product, the entire wafer may be used but more often it is cut or "diced" into squares as small as .050 inches on a side, after which it is lapped and etched to its final thickness.

To achieve the desired electrical characteristics in the finished transistor, the crystal must be sliced relative to its crystallographic planes, which are determined by X-ray examination. Be-



"HOW" TO GRIND ANGLES AND RADII EASILY ON A "SURFACE GRINDER"
USE THE QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET
RADIUS DRESSER..$44.00
Diamond $7.00
ANGLE DRESSER..$49.00
Diamond $7.00
ORDER DIRECT on our 10 day money back guarantee
Chatter Resistant, Spring Loaded Spindle
Hardened shaft—bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.
CAPACITY—1½" Convex to 4" concave
10" Wheel size for DoALL and NORTON Grinders—$49.00. Diamond $7.00
Ball Thrust Bearing.
24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.
The "Mighty Midget" Line
SPERMAN METAL SPECIALTIES • 2197 E. 21st ST. • BROOKLYN 29, N. Y.
Circle No. 433 on Card, Opposite Page 65

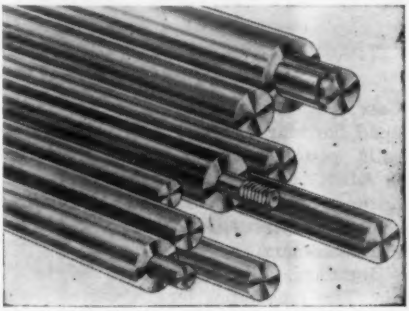
cause of this requirement slicing is not always done at exact right angles to the longitudinal axis of the crystal bar.

The DoAll Model MTA-1 Microtomatic precision slicing machine is an automatic, hydraulically actuated circular sawing machine employing a thin circular diamond saw blade for slicing ingots. The 6" x 18" work table moves on hand-scraped ways feeding the germanium or silicon ingots into the cutting wheel at rates as low as one sixteenth inch per minute. Adjustable trip dogs control the length of cutting stroke and provide automatic quick return at speeds up to 50 fpm. When slicing, automatic cross indexing takes on the return stroke. Cross indexing can be set at the hydraulic control panel to produce slices of any desired thickness accurate to plus or minus .0005". Stops are provided so that cross indexing can be adjusted to the length of the ingot or ingots being sliced. Smaller, thinner wheels reduce waste and increase the number of usable transistor blanks obtained from each crystal ingot. DoAll Co., Dept. RB, 254 N. Laurel Ave., Des Plaines, Ill.

Use ACTION Card, opposite page 64. Circle No. 160

Steel bar stock

Thomson Industries, Inc., Dept. MG, Manhasset, N.Y., has announced the standardization and availability of a new type of industrial material, "60



CARBIDE TOOL GRINDERS

HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

AMERICA'S MOST COMPLETE LINE.

Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

6", 10", 14" Wet or Dry — Chip Breaker Grinders — Diamond and Abrasive Belt Finishers.

WRITE FOR CATALOG

Hammond Machinery Builders

1614 Douglas Avenue • Kalamazoo, Michigan

Circle No. 434 on Card, Opposite Page 65

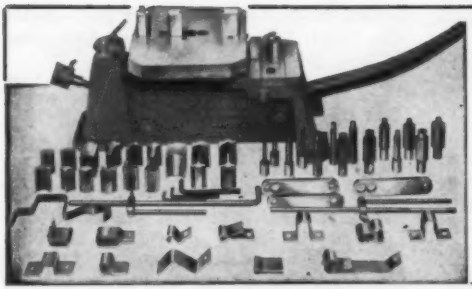
do you have a TOOL PROBLEM

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

COLUMBUS DIE-TOOL and Machine Co.

P. O. BOX 750 • COLUMBUS, OHIO

Circle No. 435 on Card, Opposite Page 65



Multiform BENDER CUTTER

CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to ⅞"x1½" as illustrated, other models up to ¼"x4".

J. A. RICHARDS CO.
KALAMAZOO, MICH.

Circle No. 436 on Card, Opposite Page 65

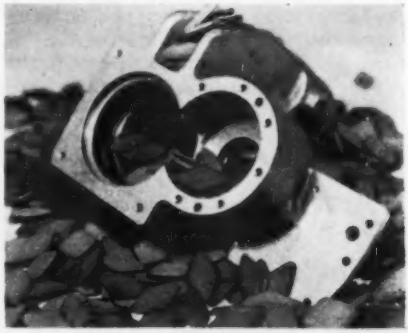
Case," available in long, round, hardened bars for use as guide rods, shafts, rolls, piston rods, axles, etc. Material is AISI 1060 steel which has a surface hardness close to 60 on the Rockwell C scale and is precision ground to standard diameters.

Standard sizes range from ¼" to 4" dia. The maximum length varies from 8 to 14 feet depending on the diameter. The depth of hardness ranges from .040" minimum in the smallest diameter to .100" minimum in the largest diameter.

Use ACTION Card, opposite page 64. Circle No. 161

Abrasive media for barrel finishing

Speed-D-Burretts, a controlled size, shape and grit abrasive media for precision barrel finishing, permit barrel finishing of parts that in the past could not be finished in this type of equipment. Special compounding of synthetic rubber and aluminum oxide allows abrasive action in remote corners and



recesses of a part without fear of media chipping, splintering or cracking into odd shapes and sizes that lodge in blind or threaded holes or difficult-to-get-at recesses.

Especially adaptable to delicate, precision parts. Available in a wide range of sizes and grits. Speed-D-Burr Corp., Dept. KE, 3613 San Fernando Rd., Glendale, Calif.

Use ACTION Card, opposite page 64. Circle No. 162

Variable Speed Drive — Full Hydraulic Operation

Speeds from 60 to 300 f.p.m. Combined with a graduated metering valve on our fully hydraulic models permits choice of proper blade speed and pressure for maximum production and blade life from high speed or high carbon steel blades.

MODELS W and F—9"x18" and 14"x18" capacity respectively, feature full hydraulic operation. All welded steel base—more rigid for heavier cutting. Welded one-piece cutting head for swifter blade changes and easier chip removal. Larger capacity coolant and chip tray. Automatic bar feed available to reduce operator's time to a minimum.

Send for FREE CATALOG. DEPT. B

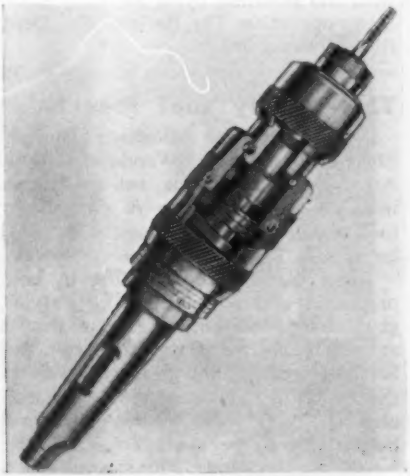
W. F. Wells and Sons
Metal Cutting Band Saws
THREE RIVERS MICHIGAN

MODELS W & F

Circle No. 437 on Card, Opposite Page 65

Tapping head controls driving torque

An adjustable-clutch tapping head, the Tap-Saver, provides automatic torque control for a broad range of working conditions. It regulates driving torque automatically according to the hardness of material and type and size of tap, after a simple dial setting is made. Thread accuracy and finish are claimed to be improved, output per tool increased, tap breakage virtually eliminated, and over-all machining time cut.



Threads can never be forced or "chattered" when the spindle is withdrawn as it elevates slightly ahead of the tap so that the tap leaves the hole by spring retraction.

The unit can be used for drilling, reaming, spot facing and counterboring, in addition to right or left hand tapping. A quick-change chuck permits rapid tool changes for different operations.

Operations such as drilling, reaming and tapping the same hole can be performed in sequence without repositioning the machine spindle or the work. Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., Dept. RB, Fond du Lac, Wis.

Use ACTION Card, opposite page 64. Circle No. 163

Great Buys For

VICTOR'S 25TH ANNIVERSARY YEAR

Our special import...

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	$ 6.00	$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
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Dealers in Tool Room Equipment

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Circle No. 438 on Card, Opposite Page 65

New electronic process automatically calculates formulas

Electronic computing equipment has been linked with a punch card system to calculate automatically the manufacturing formulas for all grinding wheels produced by the Bay State Abrasive Products Co., Dept. JP, Westboro, Mass. The company calls their new process "Electronic Formulation."

This system precisely spaces every interval between grade and structure changes equally along a perfect progression. This gives the Bay State engineer an extremely accurate measuring device for recommending wheel specifications that will best fit the job.

Electronic precision replaces the possibilities of human error in figuring formulas which control the manufacture of every wheel.

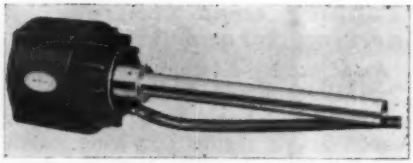
Formulas for every wheel are preserved on punched cards for electronic computers. This insures absolute accuracy in duplicating wheel formulation, with faster order processing.

Use ACTION Card, opposite page 64. Circle No. 164

Collet closer for automatic stock holding

The Model BCC-60 collet closer provides hollow spindle lathes and other rotating hollow spindle machines with automatic or semi-automatic stock holding. Collets may be opened and closed instantly without stopping the machine, and holding pressures do not vary from piece to piece. Variations in stock size do not affect the action, therefore in many cases an entire grinding operation is saved.

Simple in construction, it consists basically of a hollow draw bar mounted through the center of an air cylinder. The machine collet, fastened to the end of the draw bar, is opened and closed by operating the air cylinder. The air cylinder is a non-rotating type and exerts a closing pressure equal to 25



times the air pressure applied. The draw bar permits through-feeding of stock up to a maximum of 1" in diameter.

The BCC-60 may be pushbutton controlled by the operator or interlocked with the machine cycle for fully automatic operation. The Bellows Co., Dept. RH, Akron 9, O.

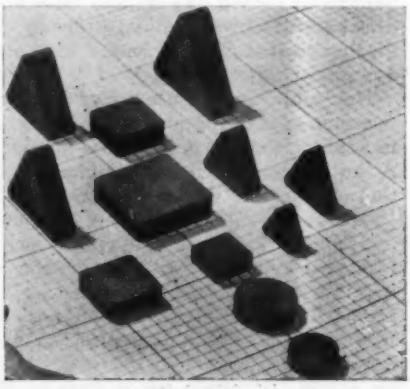
Use ACTION Card, opposite page 64. Circle No. 165

Throwaway tool inserts

Carmet Div. of Allegheny Ludlum Steel Corp., Dept. JS, Wanda and Jarvis Aves., Detroit 20, Mich., has announced it has a complete line of throwaway tool inserts for use in mechanical tool holders.

These blanks are available in both precision ground and utility styles, ground top and bottom. These inserts are available in Carmet's new "600 Series" steel cutting grades as well as those grades recommended for machining cast iron and non-ferrous metals. They are available in 12 different sizes—rounds, squares, triangles.

Use ACTION Card, opposite page 64. Circle No. 166



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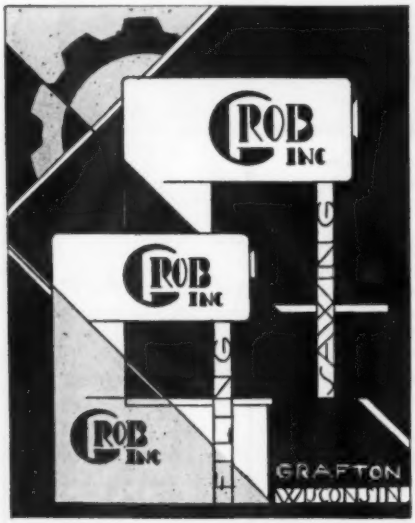

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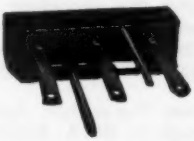

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Circle No. 443 on Card, Opposite Page 65

DON'T OVERLOOK THESE FEATURES

MACHINE AND TOOL blue book

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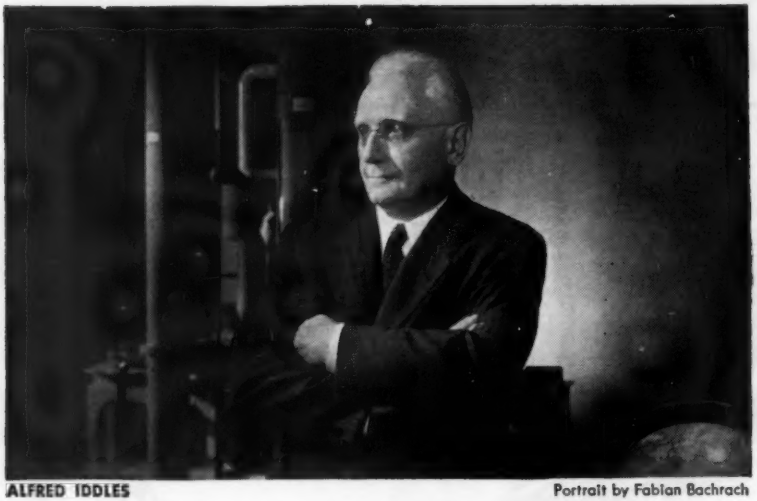

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Circle No. 445 on Card, Opposite Page 65

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. **Rates: $20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.**

Copy should reach us by the first of the month for next month's issue.

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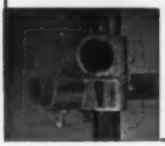

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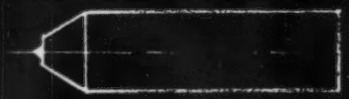

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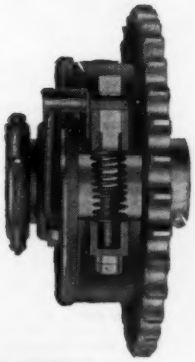

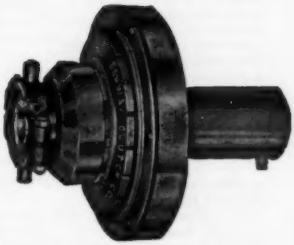

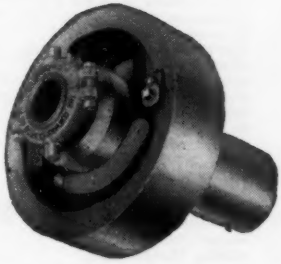

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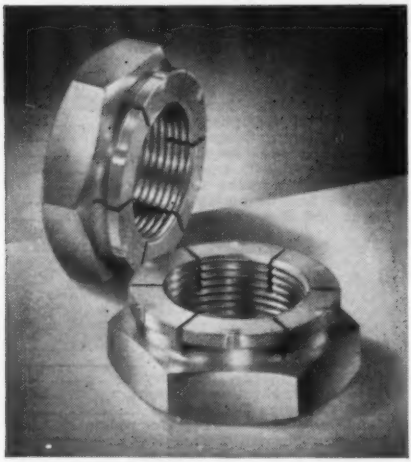

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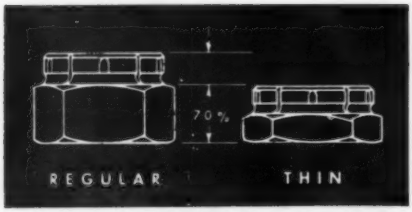

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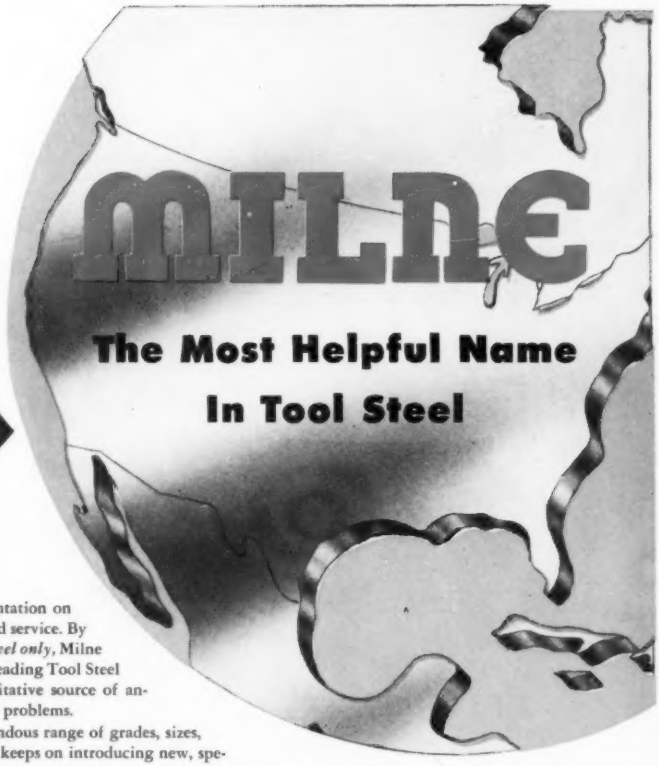

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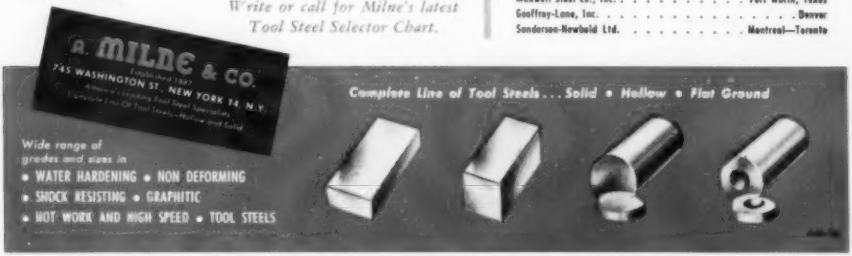
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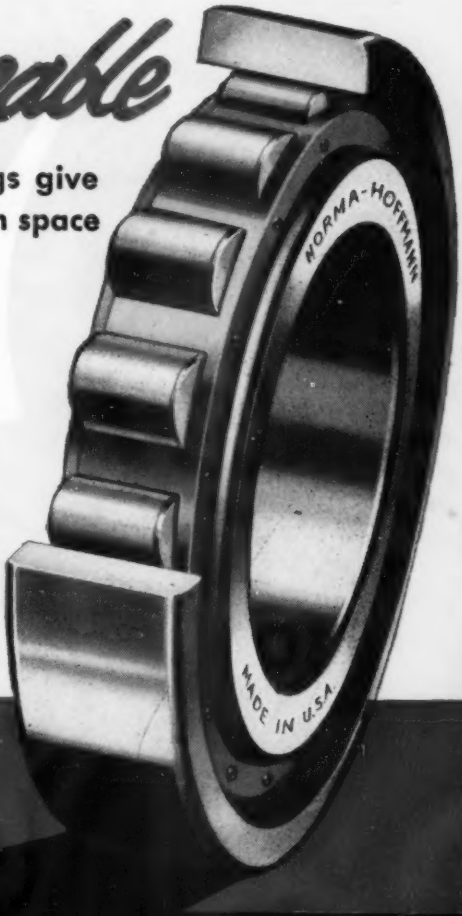

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